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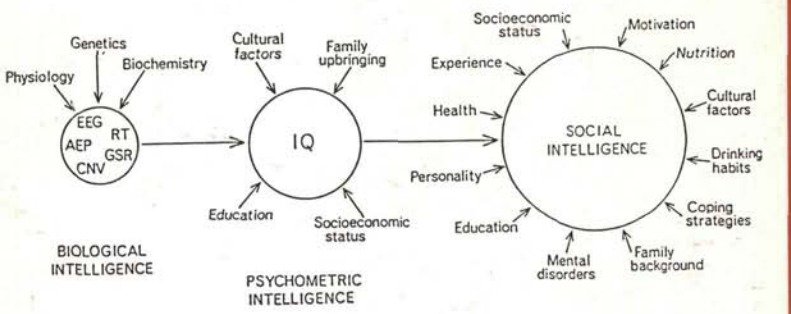


Three different conceptions of "intelligence"

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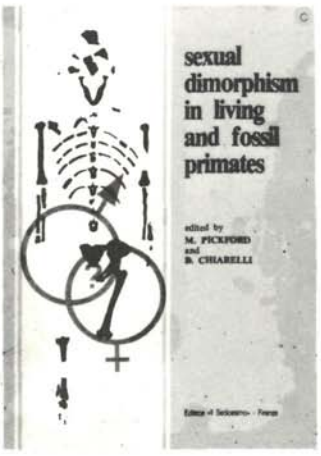


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*Cover Picture:* Three different conceptions of "Intelligence" (See article: *Thomson's "Bonds" or Spearman's "Energy": Sixty Years On*)

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# THOMSON'S "BONDS" OR SPEARMAN'S "ENERGY": SIXTY YEARS ON

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The author examines the relative merits of the Binet-Thomson-Guilford theories of intelligence and Spearman's theory of intelligence as "energy". This latter was compatible with Galton's concept of general intelligence as a primarily biological and genetically transmissable reality.

Almost from the beginning of the scientific study of human intelligence, there has been an interesting bifurcation, identified with the names and views of Sir Francis Galton and Alfred Binet (Eysenck, 1985, 1986). For Galton, general intelligence was a meaningful concept, based on biological reality, whereas for Binet it was a statistical artefact, nothing more than the average of a number of semi-independent faculties. Galton stressed the genetic side, Binet the educational and environmental. Last but not least, Galton looked for physiological methods of measurement, instancing reaction time among others, whereas Binet used tasks involving problem solving, learning, memory, etc. As has been well documented (Eysenck, 1979; Vernon, 1979), Binet's methods of measurement were almost universally adopted, and his general views were very widely accepted, particularly in the United States; psychologists in the United Kingdom were more sympathetic to Galton-type ideas. In recent years, there has been a revolution in this field, based on experimental studies of reaction time and evoked potentials as measures of intelligence (Eysenck, 1983), and these studies may cause a reappraisal of the whole situation (Eysenck & Barrett, 1985). A new "model for intelligence" (Eysenck, 1982) seems likely to emerge from these upheavals.

In this paper an attempt will be made to assess to which extent these recent findings are relevant to another theoretical bifurcation, not unrelated to that mentioned above, namely that between the Thorndike-Thomson theory of bonds (Thorndike, Bregman, and Cobb, 1927; Thomson, 1951), and Spearman's theory of "energy" (Spearman, 1927). These two causal theories were put forward in an attempt to explain certain agreed observations in the psychometric field, namely that correlations between cognitive tests were almost universally positive ("positive manifold"), and the resulting matrices tended to have a low rank, possibly rank one. Spearman argued that

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these facts supported his theory of a general factor of intelligence ("*g*"), whereas Thomson put forward an alternative view which argued that the mind had little structure and that similar psychometric effects would be manifested if "we have a causal background comprising innumerable bonds, and if any measurements we make can be influenced by any sample of that background, one measurement by this sample and another by that, all samples being possible; and if we choose a number of different measurements and find their intercorrelations, the matrix of these intercorrelations will tend to be hierarchical, or at least tend to have a low reduced rank" (Thomson, 1951: p. 271). As he also points out, this is nothing to do with the mind: it is simply a mathematical necessity, whatever the material used to illustrate it. These two alternative views had their origin already much earlier (Spearman, 1904; Thomson, 1916, 1919, 1927, 1935), and they attracted much attention. Mathematicians tended to side with Thomson (Bartlett, 1937, McDonald, 1967; Mackie, 1928), and more recently Maxwell (1972), who made an attempt to resurrect Thomson's theory.

It may at once be said that psychometrically it is impossible to decide between the two theories, as both make similar or even identical predictions. It is possible, however, to make deductions from the theories in question which are *experimentally* testable, and which may give us crucial information concerning the relevance of the theories in question to modern conceptions of intelligence. Let us consider Thomson's theory first, and then go on to recent studies relevant to Spearman's theory.

It is one interesting consequence of Thomson's theory that "if we wish to account for the correlations (between tests) in terms of a single general factor *g*, we assume that *g* is a hypothetical test which requires all the components of the mind" (Maxwell, 1972: p. 4). Generalising Maxwell's statistical development of Thomson's theory, we may say that a test's loading on the *g* factor should be proportional to the number of bonds involved. Alternatively, a test's correlation with a good measure of *g* should be an index of the number of bonds involved in that test. On this basis we should be able to assess at least roughly the *complexity* of a given test (i.e. the number of bonds involved) and predict its factor loading on a *g* factor.

On such a basis, we would expect reaction time measures to show very low correlations with good measures of *g*, such as

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the Wechsler test, and to have low loadings on a *g* factor derived from complex cognitive measures.

The first of these predictions is clearly not borne out by the facts. As Eysenck's (1986) review of the literature indicates, correlations between tests of choice reaction time of various kinds and accepted measures of psychometric intelligence are quite high when allowance is made for differences in range of talent. (Clearly correlations obtained from populations of a restricted range, e.g. students, have to be corrected for restriction of range, and studies involving retardates are inadmissible, because not only is the range unduly extended, but the possibility exists that retardates react differently to normal subjects). Even for quite short tests, correlations of over .60 can be found between RT and Wechsler IQ (Frearson and Eysenck, 1986). It would be very difficult indeed to account for such high correlations in terms of Thomson's theory of "bonds".

As a study using factor loadings, we may cite Thorndike's (1987) work. He used data originally published by Guilford (1947), consisting of a table of correlations among a set of 65 variables, composed of 45 research tests and the 20 tests of the *Air Crew Classification Battery*. For the purpose of his study, Thorndike divided the first 48 variables into six sets of eight variables that provided the matrix into which each of the remaining tests was inserted, one variable at a time. The *g*-loading of each of the 17 remaining tests was determined 6 times, each time in the context of a different set of reference tests.

One important finding was that regardless of which of these 6 sets the particular Air Crew Classification test was inserted in, its loading on the *g* factor remained strongly invariant, the median correlation over the 6 texts being 0.85. This finding might be explained equally well on Thomson's or Spearman's hypothesis.

It is very much more difficult to explain a second important finding of this study, namely that a discrimination reaction time experiment had average *g* loadings of .52, .55, .61, .59, .60, .61 in the 6 sets of 8 variables within which it was factored, giving a mean value of .58. Of all the classification tests, this gave the second highest *g* loading, higher than those for "reading comprehension", "instrument comprehension", "speed of identification", "numerical operations", "general information", "judgement", or "arithmetic reasoning"! It is hardly arguable

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that a discrimination time test of the simple kind used makes use of more "bonds" than general information, reading comprehension, or judgement tests! It would seem that these results are fairly decisive in leading to a rejection of Thomson's theory. If we take these facts in addition to the points made by Vernon (1979), namely that already by the 1930s most experimental psychologists were realising that the traditional view of mental processes as built up from associations or stimulus-response bonds was quite inadequate, and that the notion of neurological functioning as a kind of telephone switch-board with each bond dependent on the synapses between particular neurons had proved untenable, we must conclude that Thomson's theory, while ingenious and statistically adequate for its purpose, is psychologically unsound and disproved by experiments.

Within RT data, interestingly enough, there appears to be a very high correlation (+0.95) between mean RTs of 8 different tests and the correlations of these RTs with the tests' correlations with IQ. In other words, "it appears quite likely that the relative complexity of the several RT tests is responsible for the extent to which the tests correlate positively with the *g* loadings of psychometric subtests." (p. 98). This relationship does not obtain for choice RTs using 0, 1, 2 and 3 bits of information arrays (Vernon, 1986).

It had always proved difficult to find any way of testing Thomson's theory, and there has been much agreement with Loevinger's (1951) statement that his theory makes no "assertion to which evidence is relevant." (p. 595). Maxwell, Fennick, Fenton and Dollimore (1974) have attempted to provide positive evidence, but alternative explanations of their results are possible. Willerman and Bailey (1987, in press) have argued that: "results derived from the deaf and the blind individuals affected with Turner's and Kleinfelter's syndrome, and those with XXX aneuploidy all point to the anatomic or functional independence of some verbal and non-verbal abilities. The usual positive correlations between phenotypically different mental tests probably come from concurrently independent, but none the less similarly developing neural machinery". Their evidence is another powerful argument against the Thomson theory.

Let us now turn to Spearman's (1927) view that *g* was ultimately the manifestation of some form of *energy*. He quotes Fechner, Bain, J.S. Mill and Herbert Spencer as earlier advocates of this view, as well as a long list of later writers, including,

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among others, Woodworth, Woodrow, and Thurstone. None of these authors, however, has put forward a testable and specific theory relating cognitive output to energy, and Spearman himself is quite vague on this point. "Energy", like "bonds", is not presented as a worked-out theory, but rather as a concept that might acquire empirical meaning later on.

The possibility of suggesting such a theory may start with work on glutamic acid, the importance of which was emphasized by Zimmerman and Ross (1944) who reported that feeding of glutamic acid to dull young rats resulted in a considerable improvement in maze-learning ability. Albert and Warden (1944) also reported beneficial effects of glutamic acid on the performance of rats in complex reasoning problems. This work was extended to mentally retarded children, the results suggesting that the acid might increase their IQ as measured by standard intelligence tests. However, not all investigations have given favorable results, as indicated in a review by Hughes and Zubek (1956). Some animal experiments, too, have given negative results, probably because positive results have only been achieved with *dull* rats, so that experiments using average or bright rats are strictly irrelevant to the theory.

These empirical datas are supported by theoretical considerations. Zimmerman, Burgemeister and Putnam (1949) have argued that improvement in learning ability might be due to the facilitatory effects of glutamic acid upon certain metabolic processes underlying neural activity. Thus it is known that glutamic acid is important in the synthesis of acetylcholine, a chemical substance necessary for the production of various electrical changes appearing during neural transmission. Nachmansohn, John and Waelsch (1943) have shown that the rate of acetylcholine formation could be increased 4 to 5 times by adding glutamic acid to dialysed extracts in rat brain, and Waelsch (1951) has shown that the concentration of glutamic acid in the brain is disproportionally high, as compared with the concentration of other amino acids, and is capable of serving as a respiratory substrate in the brain in lieu of glucose. Finally, Sauri (1950), experimenting on rats, discovered that the acid exerts its main effect on the cerebral cortex, lowering its threshold of excitability.

Clearly, glutamic acid is important in cerebral metabolism, and the fact that it is effective in dull rats only suggests that the cerebral metabolism of dull rats is defective in some ways, while

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that of average and bright rats is normal, allowing glutamic acid to facilitate and improve the defective cerebral metabolism of the dull animals, while having no particular effect on the normal metabolism of the bright ones. This suggestion is strengthened by the fact that Himwich and Fazekas (1940), in a careful study of tissue preparations from the brain of mentally retarded persons, were able to show that these tissues were incapable of utilizing normal amounts of oxygen and carbohydrates. In other words, the cerebral metabolism in these mentally retarded patients was defective.

The later history of what turned into a heated controversy is traced by Spitz (1986), who is relatively pessimistic about the possibility of using glutamic acid to increase IQ in dull humans and rats. He does not report on the latest studies along these lines which give a rather more hopeful aspect to this possibility, as well as forming a link between this work and Spearman's theory.

Weiss (1982, 1984, 1986) has recently taken up the general theory of "energy", and cited a number of studies which take further the early work on glutamic acid. Thus IQ has been found correlated with the activity of brain choline acetyltransferase to the extent of .81 (Perry, Tomlinson, Blessed, Burgman, Gibson and Perry (1978), with brain acetylcholinesterase to the extent of .35 (Soininen, Jolkkonen, Reinikainen, Holonen and Reikkinen (1983), and erythrocyte glutathione peroxidase to the extent of .58 (Sinet, Lejeune, and Jerome, 1979). Cerebral glucose metabolism rates have also been found correlated with IQ to the extent of about .6 by DeLeon, et al (1983) and Chase et al (1984). Although these studies were not intended to clarify the physiological background of normal intelligence, but rather to throw light on the metabolic causes of premature senescence and cognitive losses in Alzheimer's disease, Down's syndrome and Parkinson's disease, and normal aging, it is possible to regard these diseases as one tail of a continuous distribution (Mann, Yates, and Marcynik (1984). Furthermore, these correlations with IQ have also been confirmed in healthy comparison groups (Soininen et al, 1983; DeLeon et al, 1983; Chase et al, 1984), and hence the results must be regarded with respect.

In actual fact, the theory offered by Weiss is not dissimilar to that of Zimmerman already refered to. As Weiss (1986) points out, the brain consumes glucose as a normally exclusive source

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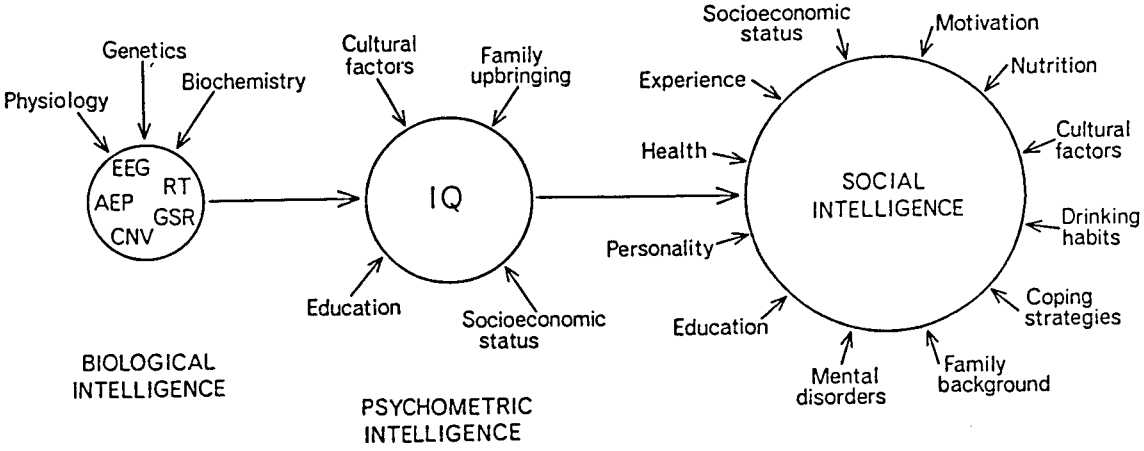


Figure 1: Three different conceptions of "intelligence".

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of energy. The human brain represents only 2% of body weight, but its energy consumption is about 20% of total energy requirements (Hoyer, 1982). Compared with a high rate of utilization, the energy stores in the brain are almost negligible, and the brain is consequently almost completely dependent on the continuous replenishment of its glucose supplies by the cerebral circulation (Reneis and Goldman, 1982). Thus it seems reasonable to assume that individual differences in brain power must find their counterparts in individual differences of brain energy metabolism. The argument is strongly supported by the fact that two research groups (DeLeon et al, 1983, Chase et al, 1984) report significant correlations in the neighborhood of .6 between regional cerebral glucose metabolism rates and a number of IQ tests. By positron emission topography of radioactive fluorine it has become possible to quantify glucose metabolism in milligrammes per 100 grammes of brain tissue per minute. The correlations so obtained, since both IQ and glucose metabolism are far from perfectly reliably measured, must be regarded as very high indeed, suggesting a strong degree of dependence of intelligence on cerebral glucose metabolism.

Clearly the data reviewed do not establish Spearman's hypothesis as correct. The numbers involved are too small, the samples are not random, too many of the groups involved are suffering from senile and other diseases, but nevertheless the data are impressive and suggestive. At the moment Spearman's hypothesis appears to have much greater promise than Thomson's for successful elaboration and greater specification of causal mechanisms.

This trend away from the "bonds" theory, and towards "energy" theory is in line with the movement away from Binet, and towards Galton (Eysenck, 1987). It would seem clear that Thomson's notions fit in much better with Binet's model of intelligence than with Galton's, whereas Spearman, who explicitly used Galton's model, would see his concept of "energy" fit in very well with the ideas originally put forward by Galton. Similarly, the notion of energy fits in very well with the genetic type of analysis, the notion of bonds with the more environmentally oriented view.

Another relationship which is of interest is that between the concepts so far discussed, and the Cattell/Horn notion of

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"fluid" and "crystallised" intelligence (Cattell, 1963; Horn and Cattell, 1966; Stankov, Horn and Roy, 1980). Crystalized ability seems to come much closer as a concept to Thomson's notion of bonds, whereas "fluid" intelligence seems more naturally related to Spearman's theory of "energy". This would lead one to suggest that it is "fluid" ability which is at the center of Spearman's *g*, a view which is strongly borne out by the use of confirmatory factor analysis (Gustafsson, 1984), and the technique of multi-dimensional scaling (Snow, Kyllonen and Marshalek (1984). The very large amount of agreement now apparent in the experimental analysis of intellect makes it apparent that the construct of general intelligence (*g*) is receiving more and more support (Humphrey's, 1979; Jensen, 1984), and although some critics still express doubts (e.g. Detterman, 1982), the downfall of the last large-scale theory to advocate Binet- and Thomson-type views, i.e. Guilford's structure-of-intellect model (Guilford, 1967, Guilford and Hoepfner, 1971) leaves the revised Spearman model (Spearman and Jones, 1950) very much as a main contender in the field (Undheim and Horne, 1977). Clearly we should not aim, as Frederiksen (1986) suggests, "toward a broader conception of human intelligence" (p. 455), but rather concentrate on a better and more fundamental understanding of the nature of *g*.

This point may be clarified by reference to Figure 1, which illustrates three different meanings of the term "intelligence", commonly used almost interchangably, although they are so different that no rational discourse is possible unless it is specified to which of these three meanings reference is made (Eysenck, 1985, 1986). Most fundamental is the concept of biological intelligence, first put forward by Galton as a physiological, biochemical and genetic basis of all cognitive behavior, and all differences in cognitive ability. Binet's notion of psychometric intelligence or IQ is largely determined by biological intelligence, but also by educational and cultural factors, socioeconomic status, family upbringing etc. Finally, social or applied intelligence is to a large extent determined by IQ, but also by a large number of other factors, as indicated in the figure, such as personality, motivation, etc. By being such a complex melange of many different variables, social intelligence has little scientific meaning, and is incapable of being analysed as a unit. Sternberg (1982, 1985; Sternberg and Salter, 1982)

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seems to adopt social intelligence as the major definition of the term, but his admission that this concept involves personality, motivation and many other factors clearly disqualifies "social intelligence" from being considered a scientific concept. If we accept Sternberg's views, we would have to say that "social intelligence" (as a "supraordinate concept") includes intelligence, personality, motivation etc. among its components, thus using the term "intelligence" in two entirely different senses. If it be true that science always proceeds in the direction of more refined analysis, then clearly biological intelligence is a much more fundamental variable than social intelligence, and theories such as those of Thomson and Spearman are of fundamental importance to a better understanding of the concept. This is not to say that adaptation to social life (which seems to be Sternberg's major definition of social intelligence) is not deserving of analysis; the interaction of the variables indicated in figure 1 is obviously of considerable social importance, and deserves to be studied in detail. What is objectionable is the use of the term "intelligence" to denote this complex of variables, most of which are non-cognitive and non-intellectual.

We may conclude that there is now considerable evidence to favor the model originally constructed by Sir Francis Galton, elaborated by Spearman, and leading to the postulation of "energy" as a fundamental variable in the determination of individual differences in intelligence. On the other hand, the Binet-Thomson-Guilford model has not fared well at the hands of experimentalists, and should be abandoned.

All this is very relevant to the question of the *definition* of intelligence. Ever since the famous symposium that appeared over sixty years ago in the *Journal of Educational Psychology* ("Intelligence and its Measure", 1921), psychologists have tended to define intelligence in terms of some of its *manifestations*. In the original symposium, these range from E.L. Thorndike's definition of intelligence as a "power of good responses from the point of view of truth or fact", to M.L. Terman's "ability to carry on abstract thinking", or R. Pintner's "ability to adapt oneself adequately to relatively new situations in life". More recent studies, including Neisser (1979), Sternberg, Conway, Ketron and Bernstein (1981), and Sternberg and Detterman (1986) have followed this trend. This does not seem to be a reasonable or meaningful way of defining a scientific

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concept. Physicists do not *define* gravitation in terms of its consequences, such as the apple falling on Newton's head, planetary motions, the tides, the shapes of the planets, the movements of the moon, the bulging of the equator, the existence of black holes, the earth's rate of precession, galaxy formation, the movements of comets, or the existence of asteroids. They define gravitation as that which is responsible for all these events, and clearly no agreement would ever be reached if definitions were phrased solely in terms of the consequences of gravitational forces!

It is for this reason that attempts to define intelligence in terms of mental speed (Jensen, 1982a, 1982b), error rate in information processing (A.E. Hendrickson, 1982; D.E. Hendrickson, 1982), or even more fundamentally in terms of "bonds" or "mental energy" are so important; they provide a link between all the alleged phenomena characterising intelligence.

It may perhaps be advantageous to remember Newton's (1771) famous words in the Scholium (p. 12) preceding his "Mathematical Principles of Natural Philosophy". "I do not define time, space, place and motion, as being well known to all. But it must be observed that the vulgar conceive these quantities, only from their relation to sensible objects. And thence arise certain prejudices, for the removing of which, it is proper to distinguish them into absolute and relative, true and apparent, mathematical and vulgar". The undue concern with popular notions of what intelligence means, which is usually translated into some of the notions mentioned above, is characteristic of the vulgar "relation to sensible objects". What scientists have to do is to strive to overcome this reliance on appearances, and attempt to elaborate theories and definitions that go deeper. This was the original justification for Thompson and Spearman in putting forward their theories, for which at the time there was little evidence. It seems reasonable to suggest that future progress depends crucially on experimental studies testing these theories, and bringing forth evidence to support or reject them.

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# ANTHROPOLOGY IN CONTEMPORARY EUROPE

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Based upon his concluding remarks, presented at the Fifth European Congress of Anthropology in September 1986, the President of the European Anthropological Association reports on contemporary European approaches to the science of man.

Amongst European anthropologists the term "anthropology" covers the entire complex of studies relating to the origin and the physical and socio-cultural evolution of Man as a zoological species. Other disciplines deal with specific aspects of humans and their works but only anthropology specifically studies the position of our species in Nature, its origins, its collocation among the mammals, the relationship between our species and other life forms and its relation with the environment – which has been deeply transformed especially as a result of the industrial revolution of the past two centuries.

Thus, anatomy describes the detailed structure of our body, physiology studies its functioning, pathology investigates the abnormal processes, psychology deals with the elaborative properties of our brain, and history deals with the products of human culture. But none of these sciences or disciplines deals with our species in a specifically naturalistic way.

## Recent Changes in Perspective

In the years that have passed since World War II, anthropologists have developed a new interest in the study of the diverse characteristics peculiar to the human species from an evolutionary perspective. In the same period of time they have become particularly interested in the relationship between our species and the surrounding environment.

The methodological approaches adopted have been as diverse as the points of view and modes of preparation of the different scholars engaged in these studies, but the overall results obtained indicate the possibility of a successful evolutionary interpretation through the synthesis of the data obtained.

In this new phase of its development, anthropology also has to deal with the biogenetic phases of primate evolution and the physical origin of Man, as well as the evolutionary mechanisms of the cognogenetic stage in humans. Such a synthesis is essential to enable as to coordinate the knowledge we have acquired

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about our species. The organization of all the diverse data derived from the many and various sciences which study Man is a complex problem which requires the formulation of an efficient theoretical framework.

Following the theoretical simulations which during the last century took shape as a generic, idealistic vision of human evolution, in opposition to the creationist dogma of earlier centuries, the study of human origins acquired a concrete scientific basis by incorporating genetic theory into the traditional paleontological/morphological methodologies.

### Importance of Primatology to Anthropology

This new formulation has produced a constantly shifting model of the phylogenetic tree of *Homo sapiens* which is continuously modified as a result of a passionate dialectic among researchers concerning the origins and the evolution of Man. Currently, we are also witnessing a reevaluation of the study of primatology by anthropologists.

Primates constitute an essential reference point for our species. The variety of this group of mammals is generally known. The systematics of the known varieties of primates roughly recapitulate what must have been the evolutionary stages that led to the more evolved hominid forms. The prosimians can be considered as an evolutionary stage inferior to the simians. Within the simians the Platyrrhine monkeys, in spite of their extreme ecological adaptation, represent an earlier stage than the Catarrhine monkeys. Evolution among certain of the Catarrhines ultimately led to man.

Primates in general form a horizontal systematics which recapitulates the vertical systematics of fossils. They therefore represent a group of particular interest for the zoologist and of basic importance for the anthropologists. Further, the study of primate biology is specifically interesting for the human biologist.

### The Essential Interrelationship of Biology and Culture in Human Evolution

The ascertained biological kinship between our species and the other species of primates is the first indication that the study of the comparative biology of non-human primates can determine important discoveries in the field of human biology.

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Moreover, the fact that man is by far the most intellectually advanced product of biological evolution makes it necessary for us to learn how man's evolution occurred and by what means and through what stages this process was carried out.

In this evolutionary perspective the individual is the specific carrier of the genetic material and as such constitutes the fundamental biological unit. Nevertheless individuals do not have any value outside of their coexistence with other individuals of the same species, with whom they form aggregates or, as we prefer to say, populations. Ultimately it is the breeding population which confronts the biological and abiological environment, and therefore is responsible for evolutionary change in the following generations. The study of individuals and of populations makes sense for the anthropologist only in a historico-ecological perspective.

The relationship between human populations and the environment in which they live has been long neglected by Western culture. Historians, for instance, gave little value to quantitative information on the natural movements of populations. The origin of culture itself has its base in the physical characteristics (manuality, complexity of the central nervous system, adaptive specificity of the language organs) that the so-called humanists almost always neglect.

**Proposals for the Enhancement of Anthropological Instruction**

With this in mind we have attempted with a group of European colleagues, to promote an attempt to more clearly define the areas of focus for contemporary anthropology and related disciplines.

The research perspectives of traditional European anthropological sciences can be grouped into the following lines of specialization:

A) Evolution and phylogeny: The clear understanding of evolutionary and phylogenetic human origins is a fundamental step towards comprehending the biology and the behavior of modern men. More generally, this particular study not only helps us to understand the present, but also enables us to attempt predictions for the future of our species. Therefore, the reconstruction of the history of our species is a pressing necessity for anthropologists .

B) The structure of modern human populations, including genetic structure and historical demography.

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C) Interaction between man and environment. This field takes account of interactions with the physical environment (human ecology) and with the social and cultural environment (aspects of human ethology and sociobiology).

D) Human genetics. This subject deals with normal variation of hereditary characters (both in regard to individuals and to the variations of distribution in the different populations). Related areas include forensic studies, dermatoglyphics, immunological characters, paternity testing etc.

E) Human biology. This field concerns the biology of human populations (not at the level of single individuals) and includes auxologic, constitutional and geriatric aspects.

F) Human sociology. This subject should include research into the evolutionary foundations of human behavior.

Starting from this basis, a group of European anthropologists has recently attempted to identify more precisely those disciplines included in anthropological science which should properly be incorporated in up-to-date anthropological curricula at universities. Their proposals form a basis for more detailed comment and discussion. First of all, an introductory course of anthropology might be defined as follows:

> Anthropology studies man from a scientific point of view, his origins and his biological variability in time and space, including.
>
> * the position of man in the primate order
> * human evolution documented by paleoanthropology, and biomolecular and genetic data
> * the environmental, cultural, and genetic factors in human evolution
> * somatic, physiological and biochemical variability in present human populations and its possible causes
> * human adaptation related to environmental conditions
> * applied anthropology in clinics, legal medicine etc.

**Specialist Areas Requiring Attention**

The disciplines which can enrich an anthropological preparation, and which should be included in the context of further courses in anthropology, are:

1. *Anthropometry.* Anthropometry studies the criteria which quantitatively express form, dimensions and composition of the human body in living human beings as well as cadavers and

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skeletons. Its purpose is to interpret the biological variations in growth and development in the healthy individual or, in the case of groups, the genetical-environmental interaction of human populations.

In addition, anthropometry sets out standardized methods of measuring and recording single traits or groups of variables which are of general interest or of practical use as auxologic, bio-constitutional and aptitudinal variables in both sporting and professional fields.

2. *Human Population Biology.* The biology of human populations is the study of human groups from a genetical and environmental point of view.

The analysis of similarities and differences between human populations throws light on the origins of human biological variation. Human population biology includes the study of the mechanisms of adaptation to the environment; the analysis of micro-evolutionary phenomena; and the study of the quantitative evolution of groups.

3. *Ergonomics.* This discipline mainly deals with the anthropometric aspects of the relationship between man and artificial environments, in particular with the work environment. The dynamic and proxemic aspects of the study are of great interest for ergonomics. In particular, the effects of migration and urbanization are studied.

Ergonomics uses biometric methods to study the Man-Technology interface. This discipline offers interpretative criteria for prehistory, work-medicine, architecture, and engineering.

4. *Human Biology.* Human biology defines morpho- and above all physiological characters at the level of both the individual and species in both space and time. Thus, human biology is mainly concerned with the heredity of normal and pathological characters and with biological variability in relationship to environmental influence and the knowledge acquired about other living beings.

Some particularly pertinent topics for human biology are: sexual dimorphism, auxological, terontological, and ontogenetical variation, and (more generally) the study of the human life cycle.

5. *Human Ecology.* The purpose of human ecology is to determine and evaluate the complex relationships between human populations organized in communities and their physi-

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cal, abiotic, biotic, socio-cultural and economic characteristics. The primary goal of human ecology is to identify community "needs" and to satisfy them in three different respects:

* optimal adaptation of human populations to different natural and artificial environments;

* a benevolent influence of human populations on the environment;

* constant improvement of the quality of life within communities. "Quality of life" means not only the absence of illness but also the corpus of complete psychic, physical and social welfare (see the preamble of the W.H.O.)

6. *Paleoecology.* Paleoecology studies the interrelationship of man and environment during human prehistory. In particular, it studies the influence of climatic and environmental changes during the Quaternary on the evolution of human cultures and on the degree of technological development. Adaptation to the external environment is never a passive phenomenon, it implies a modification of the environment itself. Therefore, prehistoric ecology also deals with the modifications induced by our species in the surrounding world.

Prehistoric ecology also studies the interactions between the different paleoenvironmental components to facilitate a comprehensive reconstruction of their development during prehistoric times.

7. *Paleoanthropology (or Human Paleontology).* Human Paleontology studies human fossils and sub-fossils, both in their morphological aspects, and in those aspects linked to human behavior. Paleoanthropology is concerned with the origin of the hominoid and hominid phylogenetic continuua and the emergence of contemporary human populations. This is revealed not only by the acquisition of distinctive biological attributes, but also by cultural elements such as the lithic and bone industries, the structure of habitations, etc.

The approach and the methodology of paleoanthropology is scientific, while other studies of prehistoric conditions may follow historical rather than scientific methods. Since it takes account of the physical and especially the biological environment in human evolution, paleoanthropology is of necessity interdisciplinary and avails itself of information from various specialties such as quaternary geology, paleontology and paleoecology.

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8. *Primatology.* Primatology studies the natural history of primates, from their origins to the present, their adaptation to different habitats and evolution in different geographical areas. Primatology primarily deals with taxonomy and phylogeny, the comparative analysis of the morphological, physiological, biochemical, genetical and ethological and social characteristics of primates. Because of the close biological affinities between primates and man, primatology offers students a fundamental basis for the study of various anthropological disciplines.

9. *Primate Ethology (embracing Human Ethology).* This discipline deals with human behavior from a comparative perspective in relation to the behavior of other primates and other animals. More specifically, it studies the biological bases of behavior of other species, in order to assess the behavioral models characteristic of man. Primate ethology overlaps with anthropology, ethnology, experimental psychology and ethology. In recent years, alongside the more traditional psychological disciplines, new research approaches have been initiated for comparative studies with non-human primates, in an attempt to clarify the biological and evolutionary roots of human behavior and social organization.

It is hoped that these proposals will receive careful consideration and, being open to discussion, will serve to stimulate a new dynamic creativity in anthropological scholarship.

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# THE FATE OF ARABIC BOTANICAL LOANWORDS IN MODERN ARMENIAN

JOHN A.C. GREPPIN
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Armenian, more perhaps than most languages, has absorbed a prodigious number of loanwords from cultures it has lived adjacent to or which it was conquered by, however briefly. Thus there are strata of loans from the ancient Anatolian languages, Urartian, Hittite and Luwian; there is a very large Parthian stratum, and during the last two thousand years Greek, Syriac, Persian, Arabic, Mongol, Frankish and Turkish words have flowed in.

Yet Armenian resisted some of them, and this paper examines a small portion of the Arabic words that came in perhaps during the twelfth century, and which dropped from standard use after the most recent Turkish massacres 1915-1921.

Armenian, an Indo-European language most closely connected to Greek, with which it shares numerous isoglosses of a lexical(1) and phonological nature,(2) has had a recorded literature since the earliest fifth century when the Armenian version of the Bible was first compiled, following the invention of the Armenian alphabet.(3) After the completion of the Bible, other works rapidly followed, both original compositions, and further translations as well, from both Greek and Syriac. The *History of the Armenians*(4) by Moses Khorenatsi was the first full history of the Armenian people, and it was followed by more specialized works: Pʿawstos on the Iranian influence on Armenian;(5) Agathangelos(6) on the events crucial to the Christianization of Armenia, and others. Translations were valued too. Plato(7) and Aristotle(8) found their way into Armenian literature, as did religious writers like John Chrysostom;(9) there is even clear evidence that Galen(10) was read and understood, and that his pharmaceutical innovations were followed with interest.(11) There was fiction, too, and the Alexander Romance found wide distribution in Classical Armenian.(12) From Syriac came, in the fifth century, translations of Ephraim's *Commentaries* on various books of the Bible and a translation, from a Syriac translation of the Greek original, of Eusebius' *Church History*.(13)

A rather bizarre school of translation developed in the sixth century, called the Hellenizing School.(14) Greek works, those of Philo and Dionysius Thrax(15) for instance, were translated into Armenian though the translations were done in an arti-

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ficial style that closely followed the syntax of Greek. In the process, Greek words were taken over wholesale, but this literary(16) school was too artificial to survive, and it soon passed from favor.

In the Middle Ages there was a strong Arabic influence, particularly in the sciences, and we note that influence in the medical writings of the physicians(17) Mkhitar Heratsi and Amirdovlat. And in the process of bringing Arab medical thought to the Armenians, they also bore in a large number of Arabic(18) words, some for concepts or things that the Armenians lacked a word for, but often for things that were already named in Armenian. These latter intrusions diluted the stock of native words used in Armenian though they did provide the excitement of association with a new culture.(19)

What is clear is that Armenian energetically entered into literacy and, in addition to producing original works in their new alphabet, they also took care to bring foreign ideas from Greek and Syriac literature to literate Armenians. This practice was continued into the Middle Ages at which time material from Arabic became known to the Armenians.

It was about the time of the transmission of Arabic medical literature to the Armenians that a major division occurred in Armenian speech, and there developed two separate dialects, called the 'Eastern' and the 'Western.' The Eastern dialect largely followed the phonetics of Classical Armenian, but the Western dialect was innovative and showed a shift in which voiceless and voiced stops reversed themselves: CArm. *b, d, g, j* and *ǰ* > *p, t, k, c, č* and vice versa.

But at approximately the time when this shift was being reflected in the manuscripts of Western Armenia,(20) a long cultural decline was settling in. And though there was a short burst of culture during the Cilician period,(21) up to the fourteenth century, Armenian culture was largely a declining phenomenon until the beginning of the eighteenth century when a body of monks, following the Blessed Mkhitar, sought to summon the Armenians from their cultural sloth. A great dictionary of the language was compiled(22) citing uses of the words in classical and medieval literature; and works in the Classical language, hitherto available only in manuscript, were put into print. Life for the Western Armenian continued to prosper until friction with the Ottoman Turks became pronounced, culminating in the massacres in eastern Anatolia

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where up to a million and a half Armenians perished; the final blow came in the early 1920s, following the burning of Smyrna and the destruction of churches in Istanbul. The Western Armenians have scarcely recovered from this yet,(23) and Western Armenian culture, once abundant in eastern Turkey, thrives today only in diaspora, in France and America though there are brave attempts to maintain a culture and a language in the Arabic milieu of the Levant, particularly in Beirut and Aleppo.

The conservative Eastern dialect is the language of Armenians in Persian Azerbaijan, and in the larger cities of central Persian which have Armenian centers: Isfahan(24) and Shiraz, as well as the outlaying areas of Charmahal, Pariah and in Faridan, the principal town of which is Daran. But the greatest bulk of Eastern dialect speakers can be found in Soviet Armenia; the capital, Yerevan has a population of more than a million, and it is over 90 percent pure Armenian,(25) the Russian intrusion being insignificant. Before the revolution of 1917, Armenian culture in Russia was primarily located in Tbilisi,(26) in the province of Georgia, and further south, in Nakhijevan, now a city in western Azerbaijan. Yerevan, presently the capital of Soviet Armenian, was then an insignificant town with scarcely a population of thirty thousand.(27)

Armenian has relatively so few Indo-European roots in its lexicon that it was long thought not to be a separate Indo-European dialect, but rather a curious form of Persian. Heinrich Hübschmann solved this problem in 1875, and linguists have since spent considerable time trying to examine the non-native parts of the Armenian lexicon. The old Iranian profile is the highest, and here Parthian roots exist in a greater abundance (almost 700)(28) than Indo-European(29) (less than 500), according to Hübschmann's count. There is also a discernible layer of Greek(30) and Syriac(31) words that invaded the language during the earliest Armenian Christian period and during the Hellenizing period. Here words were taken directly from the original language of the text being translated into Armenian.(32) Though a good number of words are known in Armenian writing of this period (Hübschmann lists 512 Greek loans), few of these words became active parts of the Armenian vocabulary, and their roots were rarely productive.(33)

And there is a later layer of Persian and Arabic(34) words that came into the language during the Middle Ages, well after

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the first physical intrusion of the Caliphate (eight century) during the early Islamic heyday. Arabic and Persian both contributed equally at this time, though many Arabic words probably entered via Persian.(35) Hübschmann lists less than 200 of these words, but as our knowledge of Middle Armenian literature increases, so does this list get longer.(36)

There are some very old substrata, too. Some are from the first millennium BC when the Armenians were replacing the Urartians in the Lake Van area. It was presumably during this time that the Urartian loan words(37) came over into Armenian. There are very secure correspondences and Igor Diakonoff mentions numerous examples in his recent paper on that subject.(38) It has also been proposed that there are Hittite and Luwian elements, and these have been catalogued by European, Soviet and American scholars.(39) But this last substratum, perhaps the oldest in Armenian, has been greeted with some resistence by the Hittitological scholars who, with their limited knowledge of Armenian, find the suppposition too tenuous.

In addition to the Syriac loans, there is another West Semitic layer that must be considerably older. This layer seems to correspond to those West Semitic words so well known in Greek, and called the Helleno-Semitic, or Mediterranean, vocabulary. The hypothesis has traditionally stated that this West Semitic vocabulary entered Armenian in the early second millennium. However, if one equates this Semitic vocabulary with Armenian as well as with Greek, then an earlier date of transfer must be suggested, when the pre-Greeks and pre-Armenians were together in eastern Anatolia; this must surely be dated in the third millennium, before the pre-Greek people arrived in the Balkans previous to their emergence into the Hellenic peninsula ca 2000 BC.

There still remains considerable vocabulary in Armenian that cannot be identified, a common-place in all languages. We see a similar situation in Germanic, where there are words (eg. Eng. *sag, broom*) for which cognates cannot be found beyond the Germanic languages. And even in English we find words, *dog* for instance, which have no known cognates even in the other Germanic languages. These words in Armenian which cannot be identified are, probably, remnants of the old Anatolian languages with which Armenian had contact, yet whose lexicons are now, like Hurrian and Urartian, excessively small, or, like

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the language of the Hayasa,(40) languages for which we have no literature.

The subject of this paper is the names for Arabic plants that came into Armenian during the Middle Armenian period, probably by the twelfth century. Using a distinct group of words found in a single text, we have good controls. And, since this text was a dictionary, and the Arabic words were used to define Greek words, it must be assumed that the Arabic names were well known.

Armenian plant names come from diverse sources. Many are from the bounteous Iranian substratum (*knčʿitʿ* 'sesame'; *gaz* 'prickly thrift'); others are from Greek (*mološ* 'mallow', *latan, ladan* 'ladanum'); from Syriac we get *šušan* 'lily'. There are, of course, words of solid Indo-European lineage, *eṙewin* 'cedar', *aygi* 'vineyard', though they are surprisingly few.(41)

But a change came during the early Caliphate, for then the aggressive Arab people, bearing Islam, not only conquered the Armenians but also proved to be culturally superior. Especially of interest was Arab medicine and the writing of such medieval Armenian physicians as Mkhitar Heratsi and Amirdovlat are replete with Arab terminology. Plant names, used in pharmaceuticals, are especially common.

The particular body of plant names which is the subject of this paper is that group of Arab plant names found as glosses for Greek terms in the so-called Galen Dictionary. This dictionary served to define the many pharmaceutical terms that appeared in the original Greek version of Galen's *Simples*, a study of more than 800 plant names with their pharmacological value described. The oldest level of this dictionary, which appears to have multiple lexicographic stages, is perhaps from the sixth century,(42) the Hellenizing period, a time of intense interest in Greek literature and culture. But Galeon's medical writings were too abundant to be translated in full; this Greek-Armenian lexicon then served as an ancillary to the Greek Galen, giving Armenian glosses for words that would certainly be obscure.

But there is a second level of this dictionary, one in which we find, instead of Greek plant names glossed by Armenian, actual Arabic words glossed by Armenian. Fifty are recognizable, and considering the percentage of this dictionary which entirely resisted reconstruction, there might actually be more, perhaps a grand total of 75 Arabic words with Greek glosses in the Galen Dictionary.(43) These words could not, of course, have

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come in during the sixth century, with the Hellenizing period words.(44) Rather, they had to enter after the Arab intrusion. which was in the eighth century, and actually after the Arabs had acquired a sufficient knowledge of medicine to make their writings of interest. The eleventh century, or at least some time after 1040, is the suggested date (Ter Poghosian 1961: 291).(45)

In addition to the appearance of these Arabic words, glossed by Armenian equivalents, there is also a body of Arabic words that serve to gloss some Greek words, replacing, in some manuscripts, the traditional Armenian gloss, These Arabic words, which must be considered loans into Armenian,(46) could not have come into use before the other Arabic words entered as words to be glossed, approximately in the eleventh century. There are, in this text, a total of nine Arabic words that filtered into Armenian. They are listed below, along with the Armenian word they replaced (see Chart One).

These nine Arabic words have, with only one partial exception, vanished from standard use in Armenian. Arab. *gazar* is the only term to survive with any frequency, but it appears only in the Eastern dialect; though know (but understood to be Arabic) in the Western dialect, it has been replaced by *steplin.* Arab. *khîyâr* has given way entirely to *varung* though in the Eastern dialect *xiar* remains as a off-color euphemism for the penis. Arab. *mišmiš* is a term well known to Western dialect speakers, but it is not used any longer in Armenian speech. Arab. *sunbul* survives as Arm. *smbul* 'spikenhard' in the Eastern dialect. Arab. *farfarah* 'colt's foot' represents an uncommonly used plant, and is unknown, though its use was never extensive; the same results obtained for *qaṭîfah* and *sarw*, and for the latter *nočʻi* has certainly been the common term. Arab. *šammâm* (47) would seem to appear in this list incorrectly, for it replaces Arm. *amomon*, and is most likely a scribal error. Similarly, Arab. *khîyâr šanbar* must represent a scribal lapse.

It would seem as if Armenian has almost consciously shucked off these vestiges of foreign culture, separating out the Arab words after Arabic culture had ceased to be so influential. It reveals, in a small middle Eastern people, a desire to live comfortably with a stronger people, but once those people have passed by, to revert to their original patterns.

I think it is possible to date the time that the bulk of these Arabic words were cast off. The dating cannot be made sharply

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for any one word in particular, but can be made for the whole, with the understanding that precise parts may not fit with complete accuracy.

In addition to checking botanical handbooks written in both Eastern and Western dialect, I also consulted with native speakers of these dialects. They confirmed that none of these Arabic words, with the exception of Eastern dialect *gazar*, were prime terms in their dialect. Thus I would ask the word for 'cucumber', and they would replay *varung*, not *xiar*; for 'apricot' – *ciran*, not *mišmiš*.

When this process was finished, I would then ask if they knew at all the Arabic words that were secondarily continued in the Eastern Dialect: *mišmiš, gazar, xiar*. In all instances they first identified the word as Turkish, but after a moment's reflection said no, instead it was Arabic. Significantly, they said tahat they had first heard the words from their grandparents, who used them instead of the standard Armenian terms. This newer generation had then abandoned the so-called Turkish-Arabic word when they had learned Arabic itself, and realized that the word was not native Armenian. This movement that focused on the abandonment of foreign elements in Armenian had its inception in Istanbul in the mid-nineteenth century, championed by various Armenian intellectuals, men of attainment and spirit.(49) Yet it is one thing to begin to purify a literacy language and quite another thing to do the same for the speech of the uneducated peasant. The movement sponsored by the intellectuals had its greatest results among the peasant class following the massacres of 1915. Then the peasants began to share the feeling that it was no longer acceptable to maintain what he realized was foreign vocabulary of Turkish-Arabic origin. The standard Armenian terms were again brought into use. The language thus purified itself, purging these foreign elements on the level of everyday speech. And though these Arabic words are not wholly lost in Armenian, they have become, at least, foreign vocabulary, a status they first held nearly a millennium ago.

FOOTNOTES

(1) G.R. Solta (1960) did a thorough study of the vocabulary, with a view towards establishing the closest affiliations of Armenian within the Indo-European system.

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(2) G.B. Djahukian (1980) did a multi-featured analysis of Armenian in relation to the other Indo-European languages, and his results largely confirm what Solta's lexical study suggested. Phonologically, the most significant feature shared between Armenian and Greek is laryngeal prothesis.

(3) The invention of the Armenian alphabet by Mesrop Mashtots in the late fourth century (Maksoudian 1985) was more than a leap into literacy, but rather an attempt to establish an independent Armenian religious attitude, free from the pressures of the Greek or Syriac church.

(4) Here see, for translation and commentary, Robert W. Thomson (1978), who prefers to think that Khorenatsi's *History* was a product of the seventh century.

(5) No English translation exists, though a reprint of the Armenian text has an introduction and thorough bibliography by Garsoian (1984).

(6) A large portion of this text has been published with accompanying English translation (Thomson 1976); earlier a catechism which represented sections 259-715 of the *History* of Agathangelos was published in translation though sparse of notes by Thomson (1970). A reprint of the complete Armenian text carries a lengthy introduction by Thomson (1980).

(7) Numerous of the books were translated, among them being the *Apology, Euthyphro, Timaeus* and the *Laws*.

(8) The bulk of what little there is in Armenian was translated by David Anyaght; that which has been published are the *Categories* and *De interpretatione*. Comments on these two texts in their Armenian translation can be found in Greppin 1984.

(9) The parts of Chrysostom that have been published in Armenian translation (much still remains in manuscript alone) are the *Commentaries on the Pauline Epistles,* on *Isaiah,* on *Matthew,* on *Acts,* and a collection of his *Sermons*.

(10) John Scarborough (1986b) forthcoming) has located a portion of Galen's *Usefulness of the Parts of the Body* which was offered in Armenian, but in synopsis. In numerous medical manuscripts one reads such a phrase as "the excellent Galen says . . ." when introducing a medical idea.

(11) A dictionary to the pharmaceutical terms of Galen was compiled probably from as early as the sixth century; it focuses principally on the vocabulary found in Galen's *Simples* (Greppin 1985).

(12) This is available in English translation, with commentary by Wolohojian (1969). A Syriac version, with translation, was prepareed by Budge (1889), and has similarities to the Armenian version.

(13) The movement of Greek material into Armenian via Syriac is not unknown elsewhere; it is likely that the Armenian version of the *Geoponica* is from the Syriac rather than the Greek original. Syriac served as an intermediary for Greek material coming into Arabic as well, and numerous parts of Galen and other medical writers appeared in Arabic through Syriac (Levey 1973: 30-31).

(14) This is recently described in Terian (1981).

(15) The Greek grammarian, Dionysius Thrax, is available in a complete version only in its Armenian translation. A parallel Greek-Armenian text was published by Adontz (1915); there is as well a Greek index (1915: 67-76).

(16) The Greek word ἐν 'in' passed into Armenian as *ən* or *n*, but appeared only in the texts of David Anyaght, though sometimes it erratically replaced Gk. ἀπσ and ἐκ 'from' (Greppin 1984).

(17) A translation into German, with copious notes, was prepared by Seidel (1908).

(18) Seidel (1908: 299-307) lists the Arabisms found in the Armenian text.

(19) The movement from Arabic to Armenian was not the only direction of medical knowledge; a long treatise on the care of horses (Chookaszian 1980) is also known in Arabic translation, clearly derived from the Armenian (Greppin 1986a).

(20) The earliest known transliteration showing Western phonetics appears in pseudo-Khorenatis's *Geography* where the plant name *ladanum (Cistus ladaniferus)*

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is written with the Armenian letters *latan*, presumably to be pronounced [*ladan*]. The date of the writing of this *Geography* is probably the seventh century (Thomson 1978: 51) though the spelling *latan* might be the product of later manuscript tampering.

(21) This period of Armenian language is described in Karst 1901.

(22) This dictionary, huge in two quarto volumes each of over one thousand pages, lists each word with multiple references to literature though, alas, page numbers are rarely assigneed since at the time of its publication (1836-1837) most Armenian literature still existed only in manuscript.

(23) The Asori, Christian speakers of neo-Aramaic, never recovered, and their culture that once in Turkey had schools and theological institutes has been completely erased.

(24) Actually, the principal site for the Armenians, and the location of the cathedral, is across the river Zayandeh in New Julfa, named after the original Julfa in Persian Azerbaijan whence the Armenians came during the reign of Shah Abbas I (17th century), at his insistence.

(25) Georgia, a neighboring Caucasian republic with much in common with Armenia, is only 66.8 percent pure Georgian (this includes Mingrelians and Svans), and the remaining third is divided up among Armenian, Russians, Ukrainians, Ossetes, Greeks, Abkhazians, Azerbaijanis, Jews, Kurds and others (Hewitt 1985: 173). The Ethnic purity of the Armenian republic in large part derives from the early emptiness of Armenia. In the 1979 census they numbered 4,151,241 though in 1926 their number was just 1,567,568 (Wixman 1984: 13). The two and a half million that arrived between 1926 and 1979 were almost entirely from the diaspora, and Armenian by birth.

(26) The largest square in Tbilisi, now called Lenin Square, used to be Yerevan Square, a reference to the power of the Armenian minority.

(27) Yerevan was the capital of the Khanate of Yerevan, a well-administered province during the Qajar period. In 1828 the Russians assumed power.

(28) Basic vocabulary is of Iranian descent: *spitak* 'white', *sox* 'onion', *navasard* 'the first month of the year' are Iranian, and productive.

(29) Even certain numbers are not of Indo-European origin; *hariwr* '100' is of unknown origin but perhaps Iranisn (Bailey 1987); *hazar* '1000' is clearly Iranian. All terms of family relationship, mother, father, sister, brother, are of Indo-European origin in the Classical language, though *dustr* 'daughter' has been replaced by *aṭǰik* in the modern language, and its origin is unsure; *aṭǰik* is an old word, appearing in the Bible with the narrow meaning of 'young girl.'

(30) Hübschmann (1895) lists 512 examples (pouch, foster-brother, salamander); few of these words are parts of basic vocabulary.

(31) Proposed Syrian loans are 133 in number (lily, tax, twilight) and their productivity is ever lower than the Greek loans.

(32) For instance, the word *aliwr* 'flour' appears fourteen times in the Bible, and each time exactly replaces Gk. ἄλευρον 'id' in the original Greek text.

(33) The obvious exceptions to this are the liturgical words that the Armenians needed to practice their Christianity.

(34) Our knowledge of this later loan is incomplete, as the Middle Armenian literature is generally poorly catalogued. Loans include such words as 'jujube, fortress, henbane'.

(35) Certainly *čandan* 'sandal-wood', ultimately from Arab. *ṣandal*, entered via Per. *čandan*.

(36) Certain words are best called 'Mediterranean' words, for their real origin is obscure. Here note *əngoyz* 'walnut' where we can note Georgian *nigozi*, Hebrew *ĕgôz*, Syriac *gauzâ'*, Kurdish *əgviz*, Persian *gôz*, Arabic *ǰauz*.

(37) Our actual inventory of Urartian words is small, but the kindred Hurrian language can be used for camparative purposes. Urartian words would be Urart. *ultu*

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'camel', Arm. *ut*; Hurrian *hinzuri* 'apple (tree)', Arm. *xnjor* 'apple'.

(38) Diakonov's list of correspondences (1986) is a conservative listing; one would also want to add Arm. *maxr* 'pine tree', Hurr. *marh* 'type of tree'; yet further examples of this word appear in the Iranian realm (Kurdish *morx*) and this word for 'pine tree' might be, like *əngoyz* 'almond', an areal word whose ultimate origin is hard to define.

(39) A synopsis of this work appears in Greppin 1983.

(40) The Hittite texts mention numerous tribes in the Lake Van area for which we have no information in the language of that people.

(41) The most basic tree terms, the words for 'oak, beech, birch and pine', are missing. Here see Freidrich 1970: 162-164.

(42) This dating cannot be objectively supported, and the suggestion of the sixth century is made since it reflects a time when we would logically have expected an interest in Galen since Greek material was being read and commented on with such intensity in the Hellenizing period. There is no later period when there was a particular interest in Greek literature.

(43) There are, actually, quite a number of unusual terms found in this dictionary, some being rare Greek terms from the Byzantine period. Here see Greppin 1986b.

(44) An overview with particular respect to Arabic influence can be found, in English, in Vardanian 1982.

(45) There is an extensive English and Russian summary to this book, The Russian runs pages 484-511; the English 512-537.

(46) Numerous Arab words came into Armenian at various periods, a phenomenon certainly conditioned by the proximity of Armenians to Arabic speaking centers. The cultured Armenian learned Arabic per force, and the Arabic vocabulary he would put into Armenian would entirely depend on his specialized interests.

(47) This word appears in only one manuscript, number 1666 held in the repository at Saint James Monastery, Jerusalem.

(48) In the manuscripts, where it appears multiplely, *xiar sambar* (= Arabic *khiyar sanbar*) is consistently secondary to *zmirak*, and never a sole gloss. It appears, however, in all known manuscripts.

(49) Stimulation came largely from European sources, particularly French, but English as well. For a description of the English influence on Armenian literature, see Oshagan 1982.

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# THE AUTHORITY OF SANSKRIT IN TAMIL HINDUISM: A CASE STUDY IN TRACING A TEXT TO ITS SOURCES

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The author demonstrates the problems involved in tracing the literary sources of a well-known mythical account of the origins of the city and temple of Madurai, in southern India, due to the Hindu notion that any religious text worthy of honor must have Sanskrit origins. The ramifications of this notion are explored in the context of Tamil literary history and Hindu religious sensibilities.

Throughout India professional troops of actors reenact, in dramatic form, some of the most beloved of Hinduism's religious narratives. These performances serve both to entertain and instruct devotees. In 1980, one such troop from a large city numbered among its ranks a man who seemed to be something of a malcontent. He was convinced that one of the episodes in his group's repertoire, "The Story of the Devotee Tārārāṇī" was spurious and therefore should be omitted from the performance of the "Night-Long Goddess Story", the *Dēvi Jāgaraṇ*. His fellow actors, however, assured him that the story had canonical authority. Several said that they were sure it had appeared as a Sanskrit drama, but no one was able to satisfy him by producing the text. Finally, he took out a newspaper advertisement, offering a substantial reward for anyone who could lead him to a copy of this alleged Sanskrit text. When still no one was able to produce it, he finally won his way: the other members of the troop reluctantly agreed to eliminate "The Story of the Devotee Tārārāṇī" from the *Dēvi Jāgaraṇ*. However at the following scheduled performance local devotees exhibited genuine outrage with the omission. They liked the story, wanted to see it performed and, from their point of view, that was sufficient reason to perform it. And so, under severe public pressure, the troop reincorporated "The Story of the Devotee Tārārāṇī" into their repertoire.(1)

Classical scholarship regarding things Hindu has — for good reason — fixed upon the language of Sanskrit as the vehicle for religious expression. The assumption of the Hindu faithful seems to be that written, revealed truth, when it appears, always appears in Sanskrit first. Behind this sentiment lies the Hindu notion that truth is an eternal quality, inherent in the structure of the world. It is never discovered for the first time, but only rediscovered, revealed from a preexisting, eternal source.

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Sanskrit's authority today as a sacred language can be attributed to at least two specifiable characteristics. Its antiquity is clearly one of them. It is regarded as the very model of that which, culturally speaking, is constant. The earliest written expression in Sanskrit appears to be the ancient Vedic corpus, composed over a millenium or so, beginning about 1400 B.C.E.(2) And even though the particular form of Sanskrit found in the Vedas has fallen into general disuse, the Vedic corpus commands remarkable respect among Hindus today. This is so despite the fact that scarcely any Hindus know how to read the Vedas or would be able to understand the acclaimed Vedic mantras or chants if they heard them.

In this sense, Sanskrit is not a living, growing, or changing language, but it would be inaccurate to regard it as a "dead language." Rather, as Maurice Winternitz has put it, Sanskrit is a "fettered language." Pānini's 5th century B.C.E. grammar froze the language in its post-Vedic, classical form. For about 2,000 years, Sanskrit has been fixed and almost changeless. Today, it functions primarily as the language of religious texts and chants.

Sanskrit is not only old. Much of its authority derives from the vast range of literature it claims. The *Vedas*, the *Brāhmaṇas*, the *Āraṇyakas*, the *Upaniṣads*, the *Srauta Sūtras*, the *Dharma Sūtras*, the epic literature including the *Rāmāyaṇa* and the *Mahābhārata*, the vast Purāṇic corpus, along with the lyric and didactic poetry of the medieval period: all these constitute an impressive body of literature. Clearly, Sanskrit has been the primary language to which have been entrusted some of the most prestigious of the Hindu texts.

And yet, Sanskrit is not spoken commonly. No one learns it as a native tongue. Even when it is learned by less than 1% of the population, that 1% learns it as a second language. Relatively few people know Sanskrit, then, but 78% of the population of India speak a language derived from the Sanskrit base. The major languages of this group include Hindi, Urdu, Bengali, Punjabi, Marathi, and Gujarati.

Most of the remaining 20% of India's population speak one of four languages which are termed Dravidian. Current research by David McAlpin seems to indicate that Dravidian speakers preceded the Indo-Aryan, Sanskrit speakers into India. It is possible that the Dravidian language group came to India from Southern Iran, and that it is descended from Elamite.(3)

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Tamil, Telugu, Kannada, and Malayalam constitute the four prime languages of this language family. Each has a distinctive script, and Tamil appears to be the oldest, with a written literature that goes back to at least the 1st century C.E. Cave inscriptions in Tamil can be traced to the 2nd century B.C.E. Classical Tamil was written in basically the same script used today, and while several changes have occurred in the language, and in particular in the nuances of word meanings, Tamil remains one of the world's oldest living languages with a continuous written history.

Though it does not enjoy the classical reputation accorded to Sanskrit, its literature, even its classical literature, is extensive. It was not until the 20th century that the classical material was discovered, and even then it was though the primary efforts of one scholar, U.V. Swaminatha Aiyar, that the material came to the attention of Indologists.

> The earliest poems that have survived to the present comprise eight anthologies and ten songs, a total of 2,381 poems by 473 poets, including 102 poems by anonymous authors. A work on grammar and poetic technique entitled the *Tolkāppiyam* and eighteen minor works, which are somewhat later than the other writings, have also survived.(4)

My concern in this paper is not with the classical literature of early Tamil. What I wish to establish is that much of the literature written in Tamil has, until very recently, been relegated to a position of relative insignificance by most Indologists.(5) They have assumed that all Tamil material derives its inspiration from earlier Sanskrit literature. In part because Tamil is a spoken language which has incorporated significant amounts of Sanskrit into its vocabulary, it has mistakenly been regarded as a "prakrit," one of the many spoken languages deriving from Sanskrit. Partly for this reason, among general Indologists it has been given relatively little credibility as a vehicle for divine inspiration. In the pages that follow I hope to illustrate the effects of this attitude on my own attempts to work with, and particularly to trace, a specific Tamil text.

## The Tamil *Talapurāṇam* as Literary Genre

I have been concerned with that body of devotional literature of Tamilnadu called the *talapurāṇa-s*. The Tamil *talapurāṇam* is a sacred or traditional history (*purāṇam*) of a particularly

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sacred place (*talam*), usually a temple or pilgrimage site. Though the Tamil word "*talapurāṇam*" derives from the Sanskrit word *sthalapurāṇa*, this particular genre of Tamil religious literature is more characteristic of Tamil than of Sanskrit. Jan Gonda, in fact, claims that the Tamil *talapurāṇam* is "a unique Tamil expression of Hinduism."(6)

There are, of course, several major religious works written in Sanskrit which are termed "*purāṇa-s*." Many of them have been translated into Tamil and into English. The *Viṣṇu Purāṇa*, the *Śiva Purāṇa*, and the *Devibhāgavata Purāṇa* are just a few of the 18 major works of this genre. But there are some basic diferences between the Sanskrit *purāṇa-s* and the Tamil *talapurāṇa-s*. In general, the Sanskrit works deal with the exploits and accomplishments of the primary Hindu deities without associating either the deities or their acts with any single or particular location on earth. The Sanskrit *purāṇa-s* tend also to be much less focused in their content. In addition to recounting elaborately the mythologies of deities, they also involve accounts of

> . . . kings, ṛṣis, religious belief, worship, observances, philosophy, political ordinances, and opinions about all kinds of miscellaneous matters – the whole illustrated and enforced by tales, legends, old songs, and anecdotes . . .(7)

In contrast, the Tamil *talapurāṇam* is much more focused. There is a discernible organizing principle, and that principle is to narrate the history of one very specific sacred place. The Tamil *talapurāṇam* deals with the sacred history of a particularly auspicious shrine and with the exploits of the deities worshipped at that shrine. Though the structures of these *talapurāṇam-s* vary considerably, the works usually include accounts of 1) how that sacred spot came to be sacred, or how its sacrality was originally discovered; 2) the virtues of the sacred bathing area associated with that place of worship; and 3) the unique features of the deity worshipped at that particular spot. Descriptions of the topography, often in terms of how the resident deity created or shaped it, are common. And of course, every *talapurāṇam* serves to advertise, to sell the place it extols. Why one should worship there, in that place; what special kinds of rituals or offerings are particularly appropriate; and what practical results accrue from that worship; these are issues that tend to be addressed in the introductory sections. In short, the

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*talapurāṇam* serves to reinforce a sacred shrine's sacrality by tracing its origins to divine intervention in human history. For pilgrims, these documents constitute spiritual tourist guidebooks. In fact, at the larger temples, specially condensed versions of the *talapurāṇam-s* are usually available.

There is no agreement – and perhaps no practical means of ascertaining agreement – about the number of Tamil *talapurāṇa* texts in existence. The longest published list includes 581 titles,(8) but Kamil Zvelebil has estimated that 2,000 is a more realistic figure.(9) The list, moreover, continues to grow, for these texts continue to be written even today. In his superb work on the Tamil *talapurāṇa* literature, David Shulman has demonstrated how these texts are written, and how the writers undertake the synthetic process of weaving oral tradition into a narrative framework, a framework which depends heavily on the pan-Indian Sanskritic mythologies presented in the Sanskrit *purāṇa-s*.(10)

I have found the study of Tamil *talapurāṇa* literature a valuable focus for ferreting out how a living religious tradition in Southern India integrates current religious practices and understandings with older, Dravidian religious tradition as well as with the Sanskrit *purāṇic* traditions. One way of pursuing this highly integrative and creative synthetic process to its many sources is to seek to trace these *talapurāṇa* works to their sources. While I have had few illusions about how easy such a task might be, I decided to do so by beginning with what is "probably the most famous"(11) of these texts, the Parañcōti version of the *talapurāṇam* of the great southern urban pilgrimage center of Madurai. It is called the *Tiruviḷaiyāṭaṟpurāṇam*, "The Story of [Śiva's] Sacred Games", hereafter referred to as the *TVP*.(12)

### Searching for Origins of the *Tiruviḷaiyāṭaṟpurāṇam*

The *Tiruviḷaiyāṭaṟpurāṇam* describes how the Lord Śiva(13) married the miraculously born, semi-divine daughter of one of the early local kings of the Pāṇṭiya dynasty, a royal family that once ruled the region around the city of Madurai. In contracting this marriage, Śiva became, along with his new queen and wife, a patron deity of the city.(14) I was able to purchase 7 different Tamil versions of the text, but most of them were condensed prose renderings of the original 17th century version written by Parañcōtimunivar.(15) The hagiographic account of

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the author's life clearly indicates that divine inspiration was involved in the writing of the document. According to tradition reported by the commentator Vēṅkaṭacāmi Nāṭṭār, Parañcōti was born into a royal lineage of Śiva devotees in the Cōḻa kingdom of the Tamil-speaking South. His father was Mīṉākshi Cuntara Tēcikar, who initiated the boy into religious learning by teaching him Tamil, "the northern language" (i.e. Sanskrit), and several "Aryan texts." Parañcōti was a serious religious student, and made pilgrimages to Śiva temples throughout the land. Arriving one day at the great temple of the god and goddess of Madurai, the young man was struck with a vision. The goddess appeared to him and commanded him to praise in verse the holy games of her Lord. He did as he was commanded, and the result is the text we have today. Its first public presentation was made by Parañcōti as he sat in the sanctuary of Śiva on the Lord's sacred throne of audience. The reception accorded the work by poets, devotees, and scholars was overwhelming.(16)

As the traditional account indicates, Parañcōti's work was divinely inspired. But human inspiration was also involved: several earlier Tamil works referred to the Sacred Games of Śiva in Madurai. It is more than likely that Parañcōti was acquainted with some of them. The most famous of these literary precedents was the work of Cellinakar Perumpaṟṟap Puliyūr Nampi. His work, entitled *Tiruvālavāyuṭaiyar Tiruviḷaiyāṭaṟpurāṇam* (17) (The Story of the Sacred Games of the Holy Lord of Madurai) is also known as the *Vēmpattūrār Tiruviḷaiyāṭaḷ* (The Sacred Games of the Margosa-Wearing Lord of Madurai) and as the *Paḻaiya Tiruviḷaiyāṭaḷ* (The Ancient Sacred Games). This last term presumably distinguishes Nampi's work from the more recent Parañcōti version. The earlier text was probably written in the 12th century.(18)

### Tracing the Tradition to Earlier Sources

Both Nampi and Parañcōti enumerate the 64 sports of Śiva at Madurai, although an earlier 9th century work, the *Kallāṭam Mayilyērum* had indicated, without enumerating them, that 64 was the proper number.(19) However, there are significant differences between the works of Nampi and of Parañcōti. Nampi's earlier work contains three episodes not mentioned at all by Parañcōti: they include those in which 1) a merchant named Mūrttiyār becomes a Pāṇṭiya king (51 in Nampi), 2) the

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remarkably similar works of two poets, Kāriyār and Nāriyār, are miraculously distinguished (52 in Nampi) and 3) a female tiger graciously gives breast milk to a baby deer (53 in Nampi).(20)

The earlier version by Nampi, with 1,753 stanzas is much shorter than that of Parañcōti, whose work contains 3,363 verses. Parañcōti's work is a much more polished literary piece, and it is self-consciously chronological, in that it imposes a rather logical order on the sports and stipulates under which Pāṇṭiya king each of the events in the narrative takes place. 73 specific Pāṇṭiya kings are mentioned in the text, and the succession is always clear. By contrast, Nampi mentions only 7 Pāṇṭiya kings, and when he does so the references are much more casual.(21) Vēṅkaṭacāmi Nāṭṭār notes that the Parañcōti version tends to be more pretentious when it comes to the use of Sanskrit: several of the Tamil names are Sanskritized in an obviously studied fashion, while those same names appear in Nampi's work without the Sanskritic adaptations.(22)

Many of the episodes which both describe can be traced to Tamil sources earlier than the 12th century. For example, in Maṇikkavācakar's 9th century *Tiruvācakam* there are references to at least 16 of the episodes.(23) The author of the *Tiruvācakam*, in fact, appears as a character in 4 of the "Sacred Games" episodes, and these biographical incidents also appear in his own *Tiruvācakam*.(24)

I mentioned earlier the ninth century *Kallāṭam Mayilyērum* of Kallāṭaṉar: there, Zvelebil claims, are references to 31 of Siva's games in Madurai.(25) Though I have not been able to find a version of the eighth century *Pāṇṭikkōvai*, two secondary sources have reported independently that it makes references to two events which are described in both Parañcōti and Nampi.(26) It describes conquests by Madurai kings of the deity Indra and of Mount Meru, conquests which are attributed in Parañcōti (I.14 and I.15) and in Nampi (44 nad 61) to Ukkira Pāṇṭiyaṉ.

Moving even further back, this time to the early seventh century when the works of Tiruñāṉacampantar were written, we find references in the *Tēvāram* to five sports which later appear in both Nampi and Parañcōti(27) and to one episode which appears only in Nampi (53) in which a tigress breast-feeds a fawn.(28)

Both Parañcōti (III.51) and Nampi (51) associate Madurai

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and Śiva with the founding of a special literary academy in Madurai, known as the Tamil Academy (*Saṅgam*). But there are no references in classical Tamil literature (known as *Saṅgam* literature because it was supposedly approved by this Academy) to Śiva' games in Madurai.(29) However, the *Cilappatikāram*, a Tamil epic poem which is probably from the middle of the Fifth century C.E., and which clearly draws on classical *Saṅgam* literary material,(30) contains references to three of the sports: 1) the dance of Śiva at Veḷḷiyampalam, 2) the Pāṇṭiya king's stopping a wall of flooding water, and 3) the battle in which Indra is defeated by a Pāṇṭiya king.(31)

We can see, then, that basic themes appearing in both of the most famous of the Tamil versions of the *Tiruviḷaiyāṭaṟpurāṇam* can be traced in Tamil literary history at least to the fifth century C.E.

We turn now, strangely enough, to Greek sources reported in the work of Dessigane, Pattabiramin, and Filliozat. These authors hypothesize a connection between a 4th century B.C.E. oral tradition reported by the Greek envoy to northern India, Megasthenes, and a story about a Pāṇṭiya princess who married a deity, a story which constitutes one of the central themes of the *Tiruviḷaiyāṭaṟpurāṇam* for both Parañcōti and Nampi.(32)

That story, as told by Megasthenes, describes a deity venerated in "Methora." His only female child was given a large army to rule the territory over which she governed, and from which she derived her name, "Pandia." Unable to find an appropriate spouse for her, the god himself finally married her. The argument, presented by Dessigane, Pattabiramin, and Filliozat is intriguing, and several facts do coalesce to make their conclusion plausible:

> . . . the Pāṇṭiya kingdom and its pearl fisheries were known in northern India, where Megasthenes collected his information, from the end of the 4th century B.C.E. And a legend associated with the god of the Sūrasenas of Mathurā had, by then, been localized in the South in the country of the Pāṇṭiyas among whom it has been preserved along with much more recent legend until today, and among whom the capital is Madurai.(33)

If these conclusions are true, significant amounts of the basic plot of the *Tiruviḷaiyāṭaṟpurāṇam* were current in the oral traditions of northern India by the 4th century B.C.E. Thus, certain elements of the document's plot appear to precede even the

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earliest known examples of Tamil literature.

### The Sanskrit Versions

Besides Tamil literary sources, and material reported from the Greek sources, there is another set of materials which recounts the sacred games of Śiva in Madurai. This is the documentation available in Sanskrit. But there are problems involved in discussing the relationship of the Sanskrit to the Tamil sources. Earlier in my argument I made an effort to distinguish between the Sanskrit puranic tradition and the Tamil *talapurāṇa* tradition. The basic difficulty we now face is that most scholars who have written Tamil *talapurāṇa* works have made every effort to obscure this distinction. To be more precise, they have labored to convince readers (or listeners, as is more often the case) that every Tamil *talapurāṇam* is really a translated section of one of the Sanskrit *māhāpurāṇa*-s. Why do they do this to us, and to themselves? The answer is rather straightforward, I fear: throughout much of the recorded literary history of India, Sanskrit has been considered the language of the gods (hence, the term "devanāgarī" [belonging to the city of the gods] to describe one of most widespread of the scripts for writing Sanskrit). Given the assumption – some would call it a prejudice – that all divinely inspired literature has its Sanskrit antecedent, many Tamil writers have chosen to attribute their works to earlier Sanskrit originals. To posit a Sanskrit source as the basis of one's work is to place that work in the company of the sacred Sanskrit literary tradition. And it has been suggested that the failure to do precisely this was the reason why much of the earlier classical Tamil literature, written as it was before Sanskrit precedent-setting became the rage, has been lost.(34) From about the 9th century on, many Tamil scholars began to develop the unfortunate notion that if a literary work is (or was) in Sanskrit, it has to be good. They might have profited from the insight ascribed, perhaps apocryphally, to Mircea Eliade: "Nonsense in Sanskrit is still nonsense."

An example of the surviving bias is recounted by Vēṅkaṭacāmi Nāṭṭār: one of his acquaintances had been commissioned to write a life history, in Tamil, of the late 19th century Tamil poet Kumarakuruparacuvāmikaḷ. But the would-be biographer confided that he did not want to start his work of putting the history into Tamil until he had first read carefully the "San-

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skrit original" (*vaṭamoḻiyil mūlam*), an original of which he had never heard, and which he had never seen, but which, he was convinced, must exist. The bias is clear: if it is worth doing, it must have been done in Sanskrit first.(35)

All this is not to say that Tamil literature is entirely independent of Sanskrit. Indeed, some of the finer literary pieces in Tamil are translated versions of works originally appearing in Sanskrit.(36) What I hope to establish, however, is that we must be very careful about taking a Tamil *talapurāṇam* text at its word when it claims to have a Sansirit antecedent. Given this caution, we must now deal with the fact that there are several Sanskrit versions of the Games of Śiva in Madurai.

Parañcōti's *Tiruviḷaiyāṭaṟpurāṇam* traces its origins to the Sanskrit *Skandapurāṇam*. But immediately there is a need to be cautious about such a claim: so many Tamil texts trace their origins to the *Skandapurāṇam*, known in Tamil as the *Kantapurāṇam*, that the habit of so tracing them has become a common joke. "*Kanta*" in Tamil means "rags," and so the *Kantapurāṇam*, by this pun, becomes a "rag bag" into which is tossed a variety of scraps of tradition and folklore, and from which nearly any imaginable text may be drawn.

The rather circuitous route by which the *Tiruviḷaiyāṭaṟpurāṇam* comes to us today is described in the chapter on "The History of the Text" (*Purāṇa Varalāṟu*), verses 1-25, of which I present here a summary.(37) I recommend that only those especially concerned with this convoluted etymology follow it closely.

> The sage Sūtamuni, renowned in all of the 18 Sanskrit *purāṇa*-s as a man of great wisdom, was once seated on a tiger skin in a pavilion on Mount Kailas. A group of wise men who were seeking purification approached him and requested that he narrate a particularly efficacious tale the very hearing of which might provide the purification sought. The most illustrious of the group were Śambhupattan, Sadānanta, Uttamapuruṣa, Mahōdara, Ugravīra, and Pracāṇḍa though there were many additional god-loving devotees. Sūtamuni explains that of the stories recounted in all the 18 *purāṇa*-s there is only one which will meet their needs and which, once heard, will grant permanent release. He then proceeds to tell them where it is: of the 18 *purāṇa*-s, the most complete is the *Skanda Purāṇa*, which has 6 sections (*caṅkitai*), each named after the

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one who composed it. They include: 1) Mahasanakakumāramuni, 2) Sūta, 3) Śiva, 4) Viṣṇu, 5) Brahmā, and 6) Sūrya. The most important of these is, of course, the one composed by Śiva, the *Śiva Caṅkitai*, which was first related by Śiva to his wife Umā. At that first recitation, Kumāra, their son, was present, and he listened as he sat on his mother's lap. Later, the precocious Kumāra narrated what he had heard to the sage Agastya, and from that day on the story became known as the *Agastya Caṅkitai*. Sūtamuṉi, our narrator, first heard the story from Vyāsa, his teacher, and Vyāsa was a contemporary of Agastya, from whom he (Vyāsa) originally heard the story. The circumstances under which the story was recited to Vyāsa are these: Brahmā had a great horse sacrifice in Kāśī (Benaras) to which he invited all the gods and the following *muṉi*-s: Agastya, Vyāsa, Nārada, Janaka, Gautama, Parāśara, Vāmadeva, Valmiki, Śukra, and other lesser sages. When the sacrifice of 10 white horses was finished, the sages gathered in the great *Mutti* Pavilion before the form of Dakṣiṇamūrti (Śiva, the teacher) and there requested Narada to tell them the story of the greatest of the three renowned Śaiva holy places, a story which they had heard about through Sanakakumāra. Nārada said he did not know the story, and suggested that they request Vyāsa to tell it. But Vyāsa did not know it either, and so sent them to Agastya. Agastya indicated that he did know the story, and that it had been told to him by the great Kumāra, who heard it from his father Śiva at the time of its original presentation to Uma.

Thus, we have here an account of the *Tiruviḷaiyāṭaṟpuṟāṇam*'s divine, i.e. Sanskrit, origins. The sages mentioned are all great Sanskrit scholars and appear in several of the 18 Sanskrit *purāṇa*-s. The clear implication is that this *Agastya Caṅkitai* is a Sanskrit text. But if we ask, "Where is the *Agastya Caṅkitai*?" we get nowhere. This is the only reference to it available in Tamil literature as far as I have been able to discover. My sense is that the etymology offered here, by virture of its complication, is intended not simply to cloak the *Tiruviḷaiyāṭaṟpurāṇam* in Sanskrit respectability: it is intended as a "smoke screen" of sorts, one which will so confuse the listener that it will discourage any serious asking of the question to which it is addressed. But my skepticism here moves beyond the evidence: let us

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return to the texts.

Not surprisingly, there are other references to other Sanskrit versions (or other names for the same version?) of the Games of Śiva in the city of Madurai.(38) That on which Nampi claims to depend is the *Sārasamuccaya*, and in his text he describes it as a section of the Sanskrit *Uttaramahāpurāṇam*.(39) My search for the *Uttaramahāpurāṇam* has yielded only one other reference to the document: in a footnote to his edited introduction to Nampi's version, Vē. Cāminātaiyaṉ, whose mastery of the classic texts is remarkable, claims that the *Uttaramahāpurāṇam* is "not now available" (*ippōḻutu kiṭaikkavillai*).(40) It took quite some time but I was finally able to locate a copy of the *Sārasamuccaya*.(41) In his English summary of the document, the editor mentions nothing of Madurai or of the Games of Śiva. Written in Balinese, Javanese, and Sanskrit, it is a "compendium and cross-referencing of five different manuscripts" described as "the *Gita* of the Balinese Hindus" and presenting ". . . the essence of the high teachings and noble ideals set forth in the *Mahābhārata*."(42) If Nampi's document depends upon a *Sārasamuccaya*, it is certainly not the document I found. After four years, my search for any other copy of the *Sārasamuccaya* has turned up nothing else. What is clear is that the *Sārasamuccaya* bases its authority on originally Sanskrit texts. All that it contains, insists the editor, (and presumably regardless of the languages in which it now appears) comes from classic Sanskritic sources. The *Sārasamuccaya*, then, much like the *Skanda Purāṇam*, becomes a miraculously transforming repository: once a document becomes a part of it, that document takes on the sanctity of Sanskritic authority.

Still, there are other versions in Sanskrit of the Games of Śiva in Madurai, and these we do have. The most widely known is the *Hālāsyamāhātmya*,(43) and it parallels quite closely the version of Parañcōti. The traditional claim is that Parancoti's version is based on the *Hālāsyamāhātmya*.(44) Though somewhat doubtful, Vēṅkaṭacāmi Nāṭṭār is willing to allow for this possibility. He points out, however, that in terms of customs, literary convention, linguistic usage, and localized mythology, the document is a thoroughly Tamil cultural product. Kamil Zvelebil is even more doubtful and is willing to admit to the strong possibility that the *Hālāsyamāhātmya* is actually a translation of the Parañcōti version.(45) The strongest, and for me the most convincing position taken on the issue is that of

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Dessigane, Pattabiramin, and Filliozat. They believe Parañcōti's version came first since the *Hālāsyamāhātmya* preserves many of the Tamil proper names without transliterating them into Sanskiritized forms.(46) This argument I find rather convincing.

Zvelebil mentions two other later Sanskrit versions of the Games of Śiva in Madurai: the *Sivalīlārṇava* of Nīlakaṇṭha Dīkśita, which he regards as a 17th century version of the *Hālāsyamāhātmya* and the *Aṣṭamīpradakṣiṇam*, written in 1880 by Ramaswami Pillai. I have seen references to each of these elsewhere. Unfortunately, Zvelebil gives neither clear references nor any further details for either of these. The latter, he claims, was later translated into Tamil, but I have been unable to trace it.(47)

Finally, there are two other Tamil texts which were written after Nampi's version and before Parañcōti's. Naturally, each claims to be based on a Sanskrit original. The *Cuntarapāṇṭiyam*(48) was written by Aṉātariyappaṉ, a native of Vayaṟpati who lived in the 16th century. It claims to be based on a Sanskrit original of the same name, the *Cuntarapāṇṭiyam*. Bibliographic references to the Sanskrit version I have not been able to find.(49) The Tamil *Kaṭampavaṉa Purāṇam*(50) of Vimanata Pantitar, a native of Ilampuri, claims to be a translation from a Sanskrit document which goes by two names: either the *Kaṭampavaṉapurāṇam* or the *Nīpāraṇyamāhātmiyam*. Again, full bibliographic references to either of these documents in Sanskrit I have not been able to find.

**A Modest Conclusion**

Where, then, have we arrived in this search? It is apparent that much more effort will be necessary if the many questions raised about these texts are to be resolved. While I do not claim to have resolved the issue of whether the "Games of Śiva" first appeared in Sanskrit or Tamil, I am willing to venture a few hypotheses about the issue. First, it is not impossible that, as tradition indicates, the initial version of the document appeared in Sanskrit. Indeed, the Tamil South has long been a repository for orthodox Sanskrit scholarship and literary activity, as the figures of Saṅkarācārya and Rāmānuja will bear eloquent witness. Even the famous Sanskrit *Bhāgavata Purāṇa* appears to have been written in the Tamil-speaking South. Yet, there is no firm evidence that the first document dealing with the Madurai Games of Śiva appeared in Sanskrit, except, of course, the

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evidence of tradition. And the problem is compounded by the fact that the tradition on this issue can be notoriously self-serving. What we do have is a Tamil text (Nampi's) which is quite likely to be the earliest extant work on Siva's games in Madurai. Thus, even though Nampi tells us that his work has a Sanskrit antecedent, I am inclined not to believe him. I believe that Nampi's is the earliest written version and that it is the basis of all the other versions – Sanskrit or Tamil – available.

Second, it would be difficult to sort out the order of the various intermediate versions – Sanskrit and Tamil – that finally led us to the *TVP* of Paranċoti. Still, we find a consistent pattern developing: every Tamil source claims to have a Sanskrit antecedent or model, but no Sanskrit source of which I am aware claims to have a Tamil antecedent or model. This can be explained in one of two ways. Either all five Tamil versions mentioned above are, in fact, based on one or more of the abovementioned five Sanskrit versions, or they are not. If they are not (as I suspect is true), their claims that they are could well be due to normal religious and literary protocol whereby the ultimate claim to authority for a text is constituted by its claim to have a Sanskrit antecedent. Similarly, if the author of a Sanskrit text were using a Tamil antecedent or model, by the normal rules of the game he would be well advised not to admit it. Rather, he would be wiser to name as a model another Sanskrit text, or to insert his work judiciously into an already prestigious Sanskrit corpus, such as the *Skandapurāṇa*.(51)

I am aware, finally, that the time I have devoted to this tracing exercise has produced little conclusive evidence. But I also have the feeling that significantly more time and more effort spent working on the issue would render meagre rewards. While I, and Westerners who are concerned about issues of form criticism, may be dismayed with all this, it is likely that few Tamils would share that sentiment. More important to them is that the texts, as we have them in their various forms, exist at all.

For the average lay devotee of Tamilnadu to say that his text has Sanskrit origins probably means something very different for him or her than it would mean for Indological scholars in the West. We in the West would take it as a statement of chronology, of traceable, verifiable order. Faithful devotees, on the other hand, are more likely to take it as a testament to origins

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which are wondrous, mysterious, divine, and *therefore untraceable*. In terms of actual existing literature, and, therefore, literally speaking, I am not convinced that the account of Śiva's Games in Madurai has ultimate Sanskrit origins. Still, I would have to agree with the spirit of the claim that it does. I would have to agree that the synthetic process which dates to the early centuries of our era and which, almost miraculously, allows such a work to survive is, at the least, mysterious and wondrous.

FOOTNOTES

(1) I am grateful to Kathleeen Erndl, who reported this story, for permission to use it here. I suspect that sometime in the near future a Sanskrit version of the "The Story of the Devotee Tārārānī" will, indeed appear. Why I so suspect is really the subject of this essay.

(2) While the Vedas are probably the oldest written documents in Sanskrit, it is also true that for several generations they were not written down, but learned and transmitted orally.

(3) McAlpin, David W. "Linguistic Prehistory: The Dravidian Situation." In: Deshpande, Madhav M. and Hook, Peter Edwin, *Aryan and Non-Aryan in India*. Michigan Papers on South and Southeast Asia, No. 14, Ann Arbor: The University of Michigan, 1979, pp. 175-190.

(4) Hart, George Lucerne. *The Poems of Ancient Tamil: Their Milieu and Their Sanskrit Counterparts*. Berkeley: University of California Press, 1975, p. 7. The two scholars most involved in making these collections of classical Tamil poetry available to English speaking audiences are A.K. Ramanujan and George Hart. See Ramanujan's three works: 1) *Poems of Love and War From the Eight Anthologies and the Ten Long Poems of Classsical Tamil*. New York: Columbia University Press, 1985. 2) *Hymns for the Drowning: Poems for Viṣṇu by Nammāḻvār*. Princeton: Princeton University Press, 1981, and 3) *The Interior Landscape: Love Poems from a Classical Tamil Anthology*. Bloomington: Indiana University Press, 1967, as well as Hart's *Poets of the Tamil Anthologies: Ancient Poems of Love and War*. Princeton: Princeton University Press, 1979.

(5) While my concern here is with why and how this has occurred, I also want to note that the works of such scholars as George Hart, A.K. Ramanujan, and Kamil Zvelebil have done much already to remedy this misperception.

(6) Gonda, Jan. *Les Religions de L'Inde*. 3 vols. L. Jospin (trans.) Paris: Payot, 1962, vol. 2:40. The Sanskrit *sthalapurāṇa* tends to be a more localized form of another Sanskrit *genre* called the *mahātmya*. Or, seen from another perspective, the *mahātmya* may be regarded as a more widely known and accepted *sthalapurāṇa*. Frequently, a Sanskrit *purāṇa* will contain collections of *mahātmyas*, although the distinctions between *purāṇas* and *mahātmyas* are not hard and fast either. The *Dēvimāhātmya*, for example, resembles more the traditional *purāṇa* than it does the *mahatmya*.

(7) Hastings, James (gen.ed.). *Encyclopedia of Religion and Ethics*. 13 vols. New York: Charles Scribners Sons, 1924-1927, vol. 10, p. 447.

(8) Kiruṣṇacāmi, Vē. *Tamiḻil Talapurāṇa Ilakkiyam*. Muttucāmipuram: A. Vèlukkōṇār, 1974.

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(9) Zvelebil, Kamil Veith. *Tamil Literature.* Wiesbaden: Otto Harrassowitz, 1974, p. 248.

(10) Shulman, David Dean. *Tamil Temple Myths: Sacrifice and Divine Marriage in the South Indian Saiva Tradition.* Princeton: Princeton University Press, 1980. See chapter one.

(11) *Dictionary of Oriental Literatures.* New York: Basic Books, Inc., 1974, p. 248. D. Shulman corroborates this opinion in his "The Mythology of the Tamil Saiva Talapurāṇam" Ph.d. thesis, University of London, 1976, p. 129. Zvelebil ranks the document among the four most important of the Tamil *talapurāṇa* texts from the point of view of literary accomplishment. See his *Tamil Literature.* Wiesbaden: Otto Harrassowitz, 1974, pp. 178-179. The "Sacred Games" is the only Tamil *talapurāṇam* that receives specific mention in the *Encyclopedia of Religion and Ethics.* See vol. 5, p. 3.

(12) *Tiruviḷaiyāṭaṟpurāṇam* of Paraṅcōtimuṉivar. With commentary of Na. Mu. Vēṅkaṭacāmi Nāṭṭār. 3 vols. Ceṉṉai: Teṉṉintiya Caiva Cittānta Nūrpatippu Kaḻakam, 1927. Reissued 1965. Note that while this particular document will be referred to as the *TVP,* I will refer to the collective traditions about Śiva's games in Madurai, both in this document and in the several other versions discussed below, as "Games of Śiva."

(13) Two summaries of the text exist in Western languages. The most complete is in French: Dessigane, R., Pattabiramin, P.Z. and Filliozat, J. *La Légende des Jeux de Civa à Madurai d'Après les Textes et les Peintures.* 2 fascicules. Pondichéry: Institut Francais d'Indologie, 1960. The second, in English, is rather brief: Taylor, William (com., ed. and trans.). *Oriental Historical Manuscripts in the Tamil Language, Chiefly Bearing Upon the History of the Kingdom of Medura.* 2 vols. Madras: n.p., 1835.

(14) IN the *TVP* and among devotees, he tends to be referred to as "Cuntarēcuvarar," (The Beautiful Lord). Other terms for him include "Cōmacuntarar" (The Beautiful Moon Lord), "Kaliyānacuntarar" (The Beautiful Lord of Marriage) and "Cokkanātar."

(15) This date is affirmed by a) the commentator of my primary text, Na. Mu. Vēṅkaṭacāmi Nāṭṭār in his 1927 edition; see his Mukavurai," p. 12. It is corroborated by b) K.V. Zvelebil (1974, p. 179), c) David Shulman (1980, p. 353), d) C. and H. Jesudasan in *A History of Tamil Literature.* Calcutta: Y.M.C.A. Publishing House, 1961, p. 211, e) Vē. Kiruṣṇacāmi (1974, p. 179) and f) T.P. Meenakshisundaram in his *A History of Tamil Literature.* Annamalainagar: Annamalai University, 1965, p. 167. But there have been other estimates, ranging from the 11th to the 16th century. S.C. Chitty, for example, dates it from the 11th century. See his *The Tamil Plutarch.* Jaffna: n.p., 1859, p. 64.

(16) See *TVP,* "Mukavurai, pp. 12-13 from which this account is summarized.

(17) U. Vē Cāmināṭaiyar (ed. and commentary). Ceṉṉai: Rippaṉ Acciyantiraccālai, 1906.

(18) See U. Vē. Cāmināṭaiyar's "Mukavurai," to his 1906 edition, p. 19. See also T.G. Aravamuthan's article "The Maturai Chronicles and the Tamil Academies." *Journal of Oriental Research,* Madras, 5 (1931): 108-24, 196-214, and 6 (1932): 89-105, 274-294, 322-340, esp. vol. 5, p. 197. Zvelebil (1974, p. 178), Shulman (1980, p. 353), and Dessigane et al., vol. 1, p. iii all concur with this general date.

(19) *Kallāṭam Mayilyēṟum* of Kallāṭaṉār. Ceṉṉai: Cantira Mauli Press, 1932. See also Zvelebil (1974, p. 178) and *TVP,* "Mukavurai," p. 10.

(20) See Dessigane et al., pp. v-ix for specific chapter comparisons between the two versions. See also *TVP,* "Mukavurai", p. 11 and U. Vē. Cāmināṭaiyar's "Mukavurai" to his 1927 edition of the Nampi version. Note also that Parancoti's 28th and 29th chapters appear in Nampi's 36th; Paraṅcōti's chapter 3 appears in Nampi's 53, and Nampi compressed in chapter 12 Paraṅcōti's 13 and 19. For a summary of the three sports not appearing in Paraṅcōti's work see Ki. Paḻaniyappaṉ's

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*Kōyil Mānakar: Maturai Mīṇāṭci Cuntarar Tirukkōyil Varalāṟu*. Maturai: Tirruppaṇikkuḻu Mīṇāṭci Tirukkōyil, 1963, pp. 94-96. Another difference between the two versions is that in his introduction Nampi praises four deities of the city which are not praised in the traditional invocatory stanzas offered by Paraṅcōti: the four are Kaṉṉi, Kariyamāl, Kāli, and Ālavāy. See U. Vē. Caminātaiyar's 1906 ed., "Tirunakaracirappu," vs. 12-15.

(21) They include Malayattuvacaṉ, Cuntaramāṟar, Ukkiraṉ, Tattaṉ, Rīramāraṉ, Varakuṇar, and the unnamed son of Varakuṇar. See Nilakanta Sastri, K.A. *The Pāṇḍyan Kingdom from Earliest Times to the Sixteenth Century*. 2nd ed. Madras: Swathi Publications, 1972, p. 3.

(22) *TVP*, "Mukavurai," p. 11.

(23) For more detail, see Yocum, Glenn E. "A Study of Māṇikkavācakar's Tiruvācakam: The Setting and Significance of a Devotional Text." Ph.d. Thesis, University of Pennsylvania, 1976, p. 227 and my "The Sacred Marriage of Maturai: Myth, Ritual, and Devotion in a South Indian Temple." Ph.d. Thesis, University of Chicago, 1981, p. 14.

(24) In Nampi's work, they are chapter 27, 28, 29, and 30. In Paraṅcōti's they are chapters 58, 59, 60, and 61.

(25) Zvelebil (1974, p. 178) Zvelebil does not give specific references, however. Veṅkaṭacami Nāṭṭār lists only 20. See his *TVP*, "Mukavurai," p. 10.

(26) See C. and H. Jesudasan (1961, p. 123) and Meenakshisundaram (1965, p. 137).

(27) Napi 39 = Paraṅcōti 30 / Nampi 42 = Paraṅcōti 33 / Nampi 43 = Paraṅcōti 35 / Nampi 59 = Paraṅcōti 56 / Nampi 60 = Paraṅcōti 47.

(28) Vēṅkaṭacāmi Nāṭṭār, *TVP*, "Mukavurai," p. 11. See also *Tēvaram. Tirumuṟai* 1, 2, and 3 of Tiruñāṉacampantamūrtti. Ceṉṉai: Caivavittiyatupalaṉayantiracālai, 1911. Several of the *Tirumuṟai* hymns mentioning the sports of Madurai are included in F. Kingsbury and G.E. Phillips (trans.) *Hymns of the Tamil Saivite Saints*. Calcutta: Association Press, 1921.

(29) The issue of what constitutes a *saṅgam* work is one into which I refuse to be drawn. Rather, I take refuge in K. Kailasapathy's classification in his excellent work *Tamil Heroic Poetry*. Oxford: Clarendon Press, 1968, esp. pp. 1-54.

(30) See *Cilappatikāram* of Iḷaṅkōvaṭikaḷ. Edited with commentary by Po. Vē. Cōmacuntaraṉār. Ceṉṉai: Teṉṉintiya Caivacittānta Kaḻakam, 1973. See esp. p. 9 of the editor's *"Aṇinturai"* (Preface).

(31)

| *Cilappatikāram* | *Nampi* | *Paraṅcōti* |
|---|---|---|
| (1) III.28.65-79 | 5 | I.6 |
| (2) II. 11.15-22 | 12 | I.13 |
| (3) II. 11.25-31 | 44 | I.14 |

(32) See Dessigane et al., p. cit. pp. xii-xiii. On this same issue see also Kārāvēlane (trans. and ed.) *Kāreikkālammeiyār: Oeuvres Éditées et Traduites*, with introduction by Jean Filliozat. Pondichéry: Institut Francais d'Indologie, 1956, p. 7.

(33) Dessigane et al., op. cit. p. xiii, translation mine. Mathurā of northern India was the capital of the royal Sūrasena dynasty, and it has often been associated with Madurai of southern India. Indeed, the southern Madurai is sometimes called *"Ten Maturai"* in order to distinguish it from the northern city associated with the deity Kṛṣṇa.

(34) Vēṅkaṭacāmi Nāṭṭār, *TVP*, "Mukavurai," p. 12. On the fragility of Indian literature and the need writers felt to provide insurance policies to guarantee a document's acceptance by the "main learned and religious traditions," see J.A.B. van Buitenen's article, "A Brief History of the Languages of India," in Dimock, E., Gerow, E., Naim, C., Ramanujan, A.K., Roadarmel, G. and van Buitenen, J.A.B. *The Literatures of India*. 2nd ed. Chicago: University of Chicago Press, 1978, pp. 6-14. On the shift in Tamil literature to the Sanskrit precedent-setting mentality see Kārāvēlane (1956, p. vi) and the argument presented by J.N. Sivaraja Pillai in which

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the author attributes the many legends about the northern sage Agastya's carrying civilization southward to the attempt to cloak Tamil literature in Sanskritic respectability. cf. *Agastya in the Tamil Land*. Madras: University of Madras, no date.

(35) See Vēṅkaṭacāmi Nāṭṭār, *TVP*, "Mukavurai." p. 12.

(36) For example, 1) the well-known Tamil version of the *Rāmāyaṇa*, the *Irāmāvatāram* of Kampaṉ. Commentary by Kopālakirusṇamācāryar. 5th ed. Madras: n.p., 1953-1955, 2) the Tamil version of the *Skandapurāṇa*, the *Kantapuraṇam* of Kacciyappacivacāriyar. Commentary by Ma. Ti. Paṉukavi. Madras: n.p., 1907, and 3) the Tamil version of the *Mahābharata*, the *Makāparatam* of Villiputtūrālvar. Citamparam Naṭarājapiḷḷai (ed.) Madras: n.p., 1914. On the relations between Tamil and Sanskrit literature, see 1) Hart, George L. *The Relation Between Tamil and Classical Sanskrit Literature*. In *A History of Indian Literature*. J. Gonda (ed.) vol. X, fasc. 2. Wiesbaden: Otto Harrassowitz, 1976 and 2) Filliozat, J. "Tamil and Sanskrit in South India." *Tamil Culture*, 4, No. 4 October 1955: 225-230.

(37) In the account below, in most instances I have given the Sanskritized forms of the proper names instead of the Tamilized equivalents of Sanskrit names.

(38) When authors bother to document their mention of Sanskrit versions, they invariably cite U. Vē. Cāminataiyar's *Mukavurai* to the 1906 Nampi version, which Cāmināṭaiyar edited. My suspicion is that Zvelebil used U. Ve. Caminataiyar's material entirely, but did so without citation. See Zvelebil (1974, pp. 177-178). cf. Jeyechandrun (1985, pp. 44-45).

(39) See *Tiruvālavāyuṭaiyar Tiruvilaiyāṭarpuraṇam* of Cellinakar Perumparrap Puliyūr Nampi, U. Vē. Cāmināṭaiyar (ed. and commentary). Ceṉṉai: Rippan Acciyantiraccālai, 1906, I.35. Strangely, the *Sārasamuccaya* is not mentioned in that earlier section of Nampi's work entitled "The History of this Work."

(40) *Tiruvālavāyuṭaiyar Tiruvilaiyāṭarpuraṇam* of Cellinakar Perumparrap Puliyūr Nampi. U. Ve. Caminataiyar (ed. and commentary). Ceṉṉai: Rippan Acciyantiraccālai, 1906, "Mukavurai," p. 2, note 1.

(41) The title is transliterated somewhat differently. I reporduce here the full citation as it appears on the title page: *Sāra-Samuccaya (A Classical Indonesian Compendium of High Ideals)*. Vol. 24 of Śata-Piṭaka Series, Reproduced in original scripts and languages in a series of collections founded by Raghu Vira (ed.). New Delhi: International Academy of Indian Culture, J 22 Hauz Khas Enclave, 1962.

(42) Ibid., p. iii.

(43) See *Hālāsyamāhātma*, ed. with commentary by Vicvanātha Cāstrin. Ceṉṉapuri: n.p., 1910, in Grantha script.

(44) Eg. Zvelebil (1974, p. 177); Vēṅkaṭacāmi Nāṭṭār, *TVP*, "Mukavurai," p. 12, U. Vē. Cāmināṭaiyar (ed.), 1906, "Mukavurai," p. 3.

(45) Zvelebil (1974, p. 179).

(46) See Dessigane et al. (1960, pp. ii-iii).

(47) Zvelebil (1974, p. 179). The most recent scholarly attempt to trace the Sanskrit texts which purport to be bases for various Tamil versions of Śiva's Sacred Games can be found in Jeyechandrun, A.V., *The Madurai Temple Complex*. Madurai: Madurai Kamaraj University, 1985, pp. 44-45. He lists six Sanskrit works: 1) the Sārāsamuccya, "a section of the *Uttara Mahā Purāṇam*," 2) the Halasya Mahatmyam, "a part of Iśa Samhita of Skanda Purāṇam," 3) the Ashtami Pradakshina Mānmyam, "a part of Brahma Samhita of Skanda Puranam," 4) the Nīpāraṇya Mahātmyam, 5) the *Sundarapāṇḍyam*, and 6) the Śiva Līlārnavam of Nīlakaṇṭha Dīkshitar. However, he says that, "Neither authors of the first five Sanskrit works nor even the very existence of these first five works, are known, except Hālāsya Mahātmyam." He bases the information he presents on U. Vē. Cāmināṭaiyar's 1906 introduction to Nampi's text.

(48) *Cuntarapāṇṭiyam* of Aṉatāri, edited by T. Chandrasekharan. Madras: Madras Government Oriental Manuscripts Series, no. 41, 1955.

(49) U. Vē. Cāmināṭaiyar, written in 1906, note that the Tamil version of the

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*Cuntarapāṇṭiam* was still available "in the Paṇṭiyaṇ Book Store in Madurai." See his "Mukavurai," p. 2, note 2.

(50) *Kaṭampavaṇa Purāṇam* of Vīmaṇāta Paṇṭitar. Cennai: Vittiyārvarttiṇi Accukkūṭam, 1879.

(51) On this widespread habit, see van Buitenen's remarks on "Written Texts and Their Preservation," in Dimock et al., pp. 34-35.

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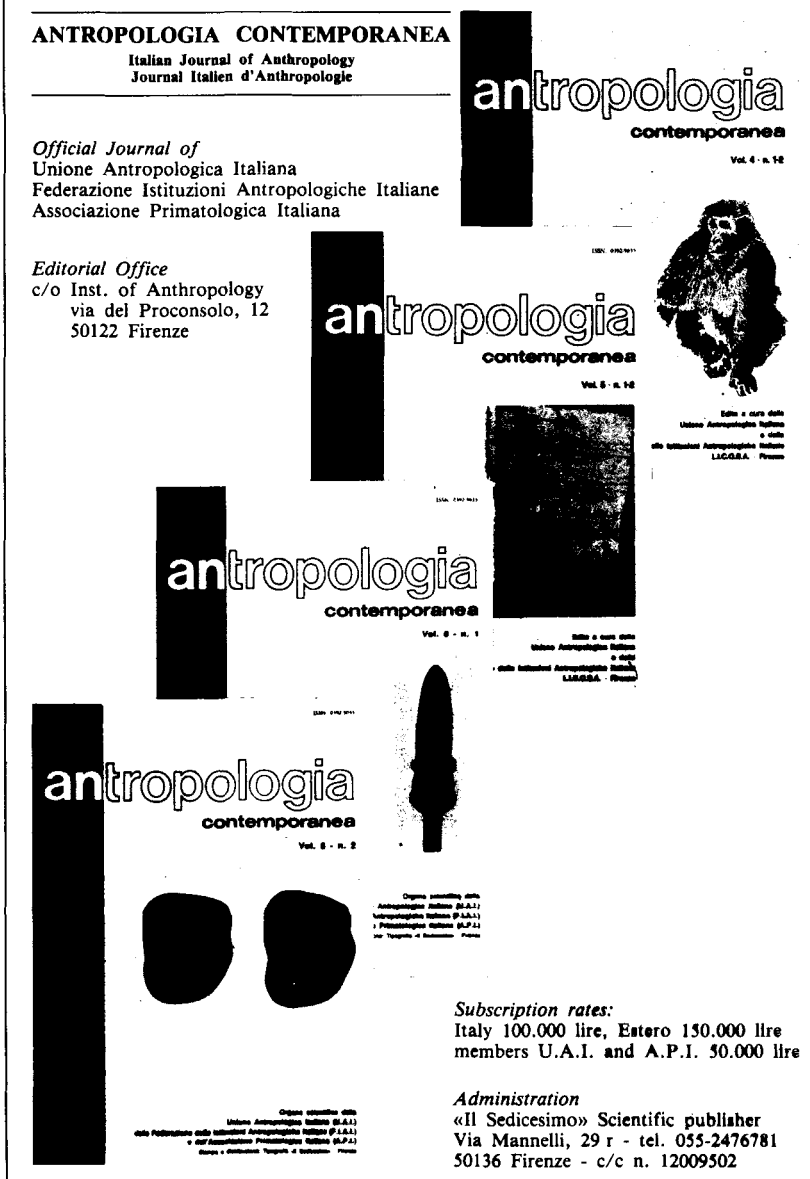


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# THE DEVIL'S DECEPTIONS: PAGAN SCANDINAVIAN WITCHCRAFT AND WIZARDRY IN MEDIEVAL CHRISTIAN PERSPECTIVE

PETER BUCHHOLZ
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The author cites several medieval Christian descriptions of pagan magical practices. These portray the actors as servants of the Devil, but provide useful information which is compatible with archaeological data.

An early 13th century Icelandic saga, *The Laxdoela Saga*, the action of which takes place from the 10th to the early 11th century, the time of Christianization, has the following report on an event in the old age of the repentant heroine Gudrún:

> Gudrún became a woman of great piety. She was the first woman in Iceland to learn the Psalter. She spent long hours at night in the church at her prayers. Herdis Bolladóttir always went with her at night, for Gudrún loved Herdís very much. It is told how one night young Herdís had a dream in which a woman came to her. She had on a woven cloak and had her head wrapped in a shawl. To Herdís the woman seemed to have the look of someone who had seen something unpleasant. She started to speak: "Tell your grandmother I'm ill-pleased with her, for she writhes on top of me night after night and lets such hot drops fall on me that I'm almost burned to a crisp. I'm telling this to you because I like you a bit better than Gudrún, and yet there's something uncanny about you too. But still I would get along with you all right if I didn't feel there was so much amiss as far as Gudrún is concerned." Then Herdís woke up and told Gudrún the dream. It seemed to Gudrún a good omen. The next morning Gudrún had the planks taken up from the church floor at the spot where she was in the habit of kneeling. Then she had the ground underneath dug up, and there they found some bones, which were black and hideous looking, also a broach and a great witch's wand. People then realized that some witch's barrow had probably been there. The bones were carried far away to a place where people were least likely to cross. (1)

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This quotation obviously presents a number of interesting aspects, all of which could lead us on – or astray – to past and present research problems in the rich field of medieval Icelandic literature. A general discussion of the role of oral tradition from the 9th and 10th centuries (or even earlier) in 13th century literature for instance, almost inevitably offers itself in the medieval Scandinavian context. My one excuse for not yielding to this strong temptation is only that I have dealt with this problem elsewhere.(2) One of the numerous devices of folk literature – and there is a degree of justification for using that term for Old Norse sagas – is the dream or prediction that comes true, and I shall likewise not deal with this phenomenon, although it is so frequent in the sagas that you have to look very hard to find a single saga without a dream. That a dead person is bothered by the tears of a relative crying at his or her grave is a well-known folk motif, slightly changed here as it is not a relative whose tears fall on the grave, and they are also rather special tears, those of a Christian and actually the first nun and hermitess in Iceland. No wonder these tears are so powerful that they penetrate the planks of the church floor and burn the bones in the grave beneath to such an extent as to force the dead witch to reveal herself in the dream.

The subsequent excavation of the witch takes place not to deliver her from such torments, of course, but to get rid of the remains. It seems to have been the usual practice to bury dangerous corpses far away from human habitation. Whether the church had been built on the barrow in ignorance of it (it might have become flattened by erosion or agriculture, e.g.) or whether, in Iceland as in continental Scandinavia, churches were consciously built upon pagan sanctuaries, the center of which was often a barrow – that we shall probably never know. Archaeology has revealed that barrows were often robbed of their treasures, and the sagas contain descriptions of such 'mound-breaking' (ON *haugbrot*), where the hero encounters the dead 'mound-dweller' (ON *haugbúi*) who defends his possessions and is frequently defeated with the aid of his own sword, which is the only one capable of 'biting' him.

The role of the dead in Old Norse literature is the last of those promising digressions which I have to leave for the time being. My topic is the pagan magician as portrayed by medieval Icelandic literature, prose to be exact, for an inclusion of the poetic sources would make the paper far too technical. Else-

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where(3) I have arranged the sources around a concept known in anthropology and the science of religion, as shamanism, which entails, roughly speaking, the attainment of a state of trance or ecstasy by various 'techniques'. In that state the soul leaves the body and 'wanders' in the beyond in search of, e.g., a supernatural cause for a sickness or a landslide. Apparently shamanism is a very old method of establishing contact with the supernatural, possibly practised as early as in the European Mesolithic. Instead of providing a summary of my previous research here, I have preferred to give a somewhat impressionistic account of magicians, male and female, as they occur and act in our sources, moving, so to speak, back and forth from pagan orality into Christian literacy.

In the early medieval European context, the pagan magician was of course by no means a figure only known in Scandinavia. Although the Scandinavian sources are by far the most numerous and the most detailed, continental German and Anglo-Saxon glosses, charms, laws and penitentiaries contain enough evidence to give us a glimpse of the magician and his or her practices.(4) If these sources are anything to go by, then they do show a rather deep penetration of popular life by superstitions and magical practices of numerous kinds, including necromancy and the use of parts of the human body as 'medicine'.

The picture of the sorcerer/sorceress in Old Icelandic prose does indeed contain almost all the aspects given by the continental sources, with the exception, not of necromancy, but of necromantic details. That dangerous section of sorcery forms, however, part of the complex picture of the god Óðinn, with whom, contrary to my initial intentions, we cannot deal in the present paper.

It is likewise impossible to quote or comment upon more than a fraction of the extremely frequent occurrences of male and female sorcerers in our sources. I am however confident that my remarks can at least cover the most important features. One of the crucial texts in this regard comes from the saga of Eirík the Red, ch. 4. It gives a very vivid description of a sorceress and of some of her practices. Similarities with Siberian shamanic costume and practices make this text a valuable document. Whether it is based on an eyewitness account of an Icelandic 'prophetess', a Lapp or Siberian & Finno-Ugric shaman (as known in Norway according to the Latin *Historia Norwegiae*) or even a Greenland or Canadian Eskimo *Angakoq*

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(shaman) is of course impossible to say. I quote this rather long description in full:

**Gudrid is told her future**

At that time there was severe famine in Greenland. Those who had gone out on hunting expeditions had had little success, and some had never come back.

There was a woman in the settlement who was called Thorbjorg; she was a prophetess, and was known as the Little Sybil. She had had nine sisters, but she was the only one left alive. It was her custom in winter to attend feasts, she was always invited, in particular, by those who were must curious about their own fortunes or the season's prospects. Since Thorkel of Herjolfsness was the chief farmer in the district, it was thought to be his responsibility to find out when the current hardships would come to and end.

Thorkel invited the prophetess to his house and prepared a good reception for her, as was the custom when such women were being received. A high-seat was made ready for her with a cushion on it, which had to be stuffed with hens' feathers.

She arrived in the evening with the man who had been sent to escort her. She was dressed like this: she wore a blue mantle fastened with straps and adorned with stones all the way down to the hem. She had a necklace of glass beads. On her head she wore a black lambskin hood lined with white cat's-fur. She carried a staff with a brass-bound knob studded with stones. She wore a belt made of touchwood, from which hung a large pouch, and in this she kept the charms she needed for her witchcraft. On her feet were hairy calfskin shoes with long thick laces which had large tin buttons on the ends. She wore catskin gloves, with the white fur inside.

When she entered the room everyone felt obliged to proffer respectful greetings, to which she responded according to her opinion of each person. Thorkel took her by the hand and led her to the seat which had been prepared for her. He asked her to cast her eyes over his home and household and herds; she had little to say about anything.

Later that evening the tables were set up; and this is

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what the prophetess had for her meal: she was given a gruel made from goat's milk, and a main dish of hearts from the various kinds of animals that were available there. She used a brass spoon, and a knife with a walrus-tusk handle bound with two rings of copper; the blade had a broken point.

When the tables had been removed, Thorkel went over to Thorbjorg and asked her how she liked his home and people's behaviour there, and how soon she would know the answer to his question which everyone wanted to learn. She replied that she would not give any answer until the following morning, when she had slept there overnight first.

Later next day she was supplied with the preparations she required for performing the witchcraft. She asked for the assistance of women who knew the spells needed for performing the witchcraft, known as Warlock-songs; but there were no such women available. So inquiries were then made amongst all the people on the farm, to see if anyone knew the songs.

Then Gudrid said, 'I am neither a sorceress nor a witch, but when I was in Iceland my foster-mother Halldis taught me spells which she called Warlock-songs.'

Thorbjorg said, 'Then your knowledge is timely.'

'This is the sort of knowledge and ceremony that I want nothing to do with,' said Gudrid, 'for I am a Christian.'

'It may well be,' said Thorbjorg, 'that you could be of help to others over this, and not be any the worse a woman for that. But I shall leave it to Thorkel to provide whatever is required.'

So Thorkel now brought pressure on Gudrid, and she consented to do as he wished.

The women formed a circle round the ritual platform on which Thorbjorg seated herself. Then Gudrid sang the songs so well and beautifully that those present were sure they had never heard lovelier singing. The prophetess thanked her for the song.

'Many spirits are now present,' she said, 'which were charmed to hear the singing, and which previously had tried to shun us and would grant us no obedience. And now many things stand revealed to me which before were hidden both from me and from others.

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> 'I can now say that this famine will not last much longer, and that conditions will improve with the spring; and the epidemic which has persisted for so long will abate sooner than expected.'(5)

The case for the antiquity of such witchcraft, which as we have already said may be traced back to the European Mesolithic and as such may have had Upper Paleolithic precursors, is strengthened by the similarities to the Siberian shamanic costume as described and photographed in ethnographical literature. I wish to emphasize the hood and staff, mentioned also in the 'excavation report' quoted at the beginning. A hood seems to have played some role in the techniques of entering a trance, as is evident from other texts, and the staff was an indispensable professional attribute of the seeress, so much so that one of the terms for (female) magicians, ON *vǫlva*, literally means 'staff-bearer'. The ON term for the song mentioned, which draws the spirits to the magical platform (ON *seiohjallr*), is *varolðkur*, a hapax legomenon probably signifying "that which attracts the spirits" (ON **vǫrðr*, a term for 'soul' or 'spirit'). What kind of magical platform or scaffold is alluded to, and whether the magician was standing, sitting, or lying on it, is difficult to say. Several sources mention this platform, but always in rather vague terms, so that it is impossible to get a clear picture. An example from *The Laxdoela Saga*:

> Thereupon Kotkel had a big incantation scaffold built. They all climbed up on it and chanted powerfully wrought charms; these were magic spells. Presently a violent storm broke loose.(6)

Chanting of spells was also effective with various other accompanying measures. Rather frequent was the use of human or animal blood and/or runic signs. An outwardly more 'passive' technique was to lie down and 'sleep'. The soul then went on its errand and brought back news of future or past events. One of the technical terms for this is ON *njóta draums síns* ("to profit from one's dream"). The saga heroes always take care not to wake somebody behaving strangely in his/her dream. Needless to say, the dreamer's predictions come true afterwards.

A sign that the various techniques of attaining ecstasy have reached their goal, consists in the sources' frequent emphasis on the sorcerer's yawning at the beginning and at the end of ecstasy. This is probably a petrified survival of the idea that the

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magician's soul is leaving the body through the mouth and returning to it in the same way. In one of the older mythical-heroic sagas, this is mentioned when an unsuspecting comrade arouses the hero Bǫðvarr biarki (B. the little bear) from his 'sleep', with disastrous effects. The hero had not been sleeping, but assisting his lord in battle in the shape of a bear (*Hrólfs s. kraka* 33). Such shape-changers (ON *hamrammr* "powerful in respect of the *hamr*", i.e. the skin or shape) occur rather frequently in saga literature. The technical terms *berserkr* ('bear shirt man') and *úlfheðinn* ('wolf costume man') indeed designate the ecstatic warrior. In the field of warfare, ecstasy seems to have become almost institutionalized, a phenomenon which we can also observe in Siberian shamanic practices. Pictorial monuments from the 6th century onwards show us a number of such warriors in animal costume. The magician and his alter ego or spirit helper – the boundaries between those two concepts can no longer be clearly drawn – are to a large degree dependent on each other, so that, when the spirit in animal form is injured or killed, the same is bound to happen to the magician who is usually said to be sitting or lying miles away. Such genuinely old features are exploited by later sagas for their potential to produce a shudder in the listener's spine, so that battles between shape-changing sorcerers become rather frequent. It is however possible that the early Viking contacts with the East and with Finno-Ugric tribes practising shamanism, contributed to the development of this motif, and that this, in turn, helped to preserve some knowledge of the 'technical' aspects of the magical basis for such practices. As an example, I give a rather detailed text:

> A little after they saw a big walrus attacking them with huge waves and terrible noise. Hörður said: Here is the monster I cannot stand and do not want to see. Now, foster-brothers, you will get some help, and you must not call me by name while *he* is present, because otherwise I die. Then he lay down in the keel, and they covered him with clothes. Now they saw a sword-fish gliding from under their boat, attacking the walrus. A mighty water battle ensued. Then they saw a beautiful dolphin emerging from under Hervör's boat, also immediately attacking the walrus. Each did the other great harm. The sword-fish and dolphin quickly tired because the walrus monster was heavy and very strong; it flung them far out into the sea.

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> Hjálmþér was now certain that the monster would soon vanquish them. So he said: When shall I ever be more in need of your help than now, Skinnhufa and Vargeysa. This said, he saw two vultures flying. Their beaks and claws were of iron. They settled down on the walrus and ripped it without mercy. They tore big lumps from its cursed body, but the monster defended itself bravely . . .

(The two heroes Hjálmþér and Ölver finally vanquish the monster by throwing their swords into the monster's eyes.)

> They killed it, and it sank to the bottom of the sea. The vultures were completely exhausted and flew away, slowly and just above the sea, with blood running from beneath each of their feathers. Hjálmþér went where Hörður lay, and noticed that Hörður was wet. Hörður said: Is the walrus dead? Hjálmþér said that it had been vanquished — and I as well as Ölver lost my sword there. Here are both your swords, said Hörður. It is a great event that King Hunding has been killed. (7)

We could go on and on, with all sorts of interesting references and problems, but considerations of space urge us to approach a conclusion. According to some anthropologists, magic is a means by which man attempts to control the supernatural (and natural) world, whereas religion is a means by which he attempts to submit to and conform with the wishes and requirements of supernatural powers. When the Germanic peoples accepted Christianity, they were required to comply with the dictates of one god, and all pagan practices which sought instead to control the supernatural were condemned as acts of the devil. That there was a belief in the effects of magic, harmful or beneficial, in the Scandinavian Middle Ages as well as in Germanic antiquity, cannot be denied. The texts, including ecclesiastical and legal sources, take a far too serious view of sorcery to allow us to relegate it into the realm of fiction. Not only did the Augustinian view of the devil's capability to produce powerful illusions permit pagan practices to survive, thinly disguised, on 13th century parchment. The demarcation of such illusions from hard reality seems, moreover, to have been difficult, if not impossible. It seems difficult otherwise to explain, e.g., the fact of successful formal judicial procedures against ghosts, walking dead, or 'night riders' (witches causing nightmares). The devil was regarded as an undeniable reality by medieval Christianity, and could indeed appear in different

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shapes. One that he particularly liked, was, fittingly enough, that of the supreme pagan god of magic, Óðinn.(8) We can well understand King Olaf, when he exclaims in a late text: "Look how daring the devil was, to appear visibly before our very eyes". In another text (*Jómsvíkinga saga*, ch. 33) a hag or goddess *Þorgerðr hǫlgabrúðr* or *hǫrgabrúðr* ("P. the bride of Helgi / the bride of stone altars") produces a violent hailstorm. She herself is only seen by men with second sight (ON *ófreskir menn*), but the hail is real enough, so that "afterwards they weighed the hailstones to determine Þorgerðr's and Irpa's greatness, and one stone weighed an ounce (*Jómsv. s.*, ch. 34. The *Saga of the Jomsvikings*, translated by N.F. Blake, London: Nelson, 1963: p. 38).

My 1968 inventory of traces of shamanism in Old Icelandic literature has even had a comparable result in respect of "fact and fiction". A German archaeologist, whose discovery is as yet unpublished,(9) has apparently succeeded, on the basis of my criteria from the written sources, to find what is actually the first ever Scandinavian witch excavated, complete with costume, staff and a pouch containing ecstasy-inducing drugs (henbane, Hyoscyamus niger, Ger. Bilsenkraut). Such an exciting discovery is of course enough of a conclusion for my paper, but I rather conclude with a statement given by Gríma, a saga witch who successfully carried on her magical practices after her conversion to Christianity. The chapter in question deals with the successful attempt by Grima to hide a certain Þormóðr from his enemies Þordís and Þorkell, by seating him in a special chair. Listen to her strong Christian views:(10)

> So Bodvar and Thordis climbed on the roof and took off the louvers. The smoke passed out and they could see everything there was in the living room. They could see Grima's chair standing in the middle of the room and Thor with his hammer carved on the posts of the chair, but they could not see Thormód. They came down from the roof again and went to the door.
>
> Then Thordis said: "There still is some heathendom about Gríma since the image of Thór is carved on the posts of her chair."
>
> Gríma replied: "I seldom get to go to church to hear the teaching of priests, for it is a long way and I have no one else in the house; but it often occurs to me when I see this image of Thór made of wood, that I could break it to

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pieces and burn it whenever I wanted to, and how much more powerful is he who made heaven and earth and all things visible and invisible and gave life to all and that no one can overcome him."

Thordís answered: "It may be that these are your thoughts; but I rather think we might force you to say more if Thorkel were not here with so great a number of men. Because something tells me that you know pretty well where Thormód is."

Gríma answered: "Now is borne out the proverb which says "there's many a miss for people who guess," and also this one: 'He who is not fated to die will escape somehow.' But what you require is heavenly keeping lest the devil entice you to do the wicked things you had meant to do. Because it is excusable that one sometimes fails to see things as they are, but it is inexcusable for anyone not to believe the truth once he has found it to be the truth."

With all her pagan sorcery, Gríma apparently is convinced that God is on her side, because her cause is good. Could she have been right?

Footnotes

(1) *The Laxdoela Saga*, trans. A.M. Arent (Seattle 1964) ch. 76, p. 191.

(2) Peter Buchholz, Vorzeitkunde. Mündliches Erzählen und Überliefern im mittelalterlichen Skandinavien auch dem Zeugnis von Fornaldarsaga und eddischer Dichtung. Neumünster: Waholtz 1980 (=Skandinavistische Studien. 13).

(3) Peter Buchholz, Schamanistische Züge in der altisländischen Überleiferung. Diss Münster 1968.

(4) See Karl Helm, *Altgermanische Religionsgeschichte, 2.2: Die Westgermanen* (Heidelberg 1953).

(5) *The Vinland Sagas. The Norse Discovery of America Graenlendinga saga and Eirik's saga*, trans. M. Magnusson and H. Palsson (Harmondsworth 1965) 81-83.

(6) *The Laxdoela Saga*, transl. A.M. Arent (Seattle 1964) ch. 35.

(7) *Hjálmþérs saga*, a scientific edition by Richard Lynn Harris, University of Iowa diss. 1970, ch. 11, p. 53-55. Cf. also P. Buchholz, Vorzeitkunde (Neumünster 1980) pp. 96-98.

(8) For this god, see e.g. P. Buchholz "Odin: Celtic and Siberian Affinities of a Germanic Deity" *Mankind Quarterly* (Washington, D.C.), 1984, pp. 427-437.

(9) I do not wish to give his name before his publication appears.

(10) Fóstbroeðra saga ch. 23. The Sagas of Kormák and the Sworn Brothers. Trans. by Lee M. Hollnader. Princeton University Press, 1949, p. 163 f.

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# COMBATING DYSGENIC TRENDS IN MODERN SOCIETY: THE REPOSITORY FOR GERMINAL CHOICE

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An account of the establishment and founding of the Repository for Germinal Choice on the lines proposed by Hermann J. Muller .

Considerable interest has arisen in recent years concerning the need to combat dysgenic trends in modern society, a concern which has been reinforced within the scientific world by recent progress in genetic research as well as research in social psychology involving the statistical analysis of human behavioral traits. This latter has been especially advanced by twin studies which have demonstrated the significance of genetics in determining and limiting behavioral potential. I have accordingly been invited to relate the circumstance which surrounds the founding of the Repository for Germinal Choice, a facility which has come to be known in the media as the Nobelist sperm bank.

From boyhood I have been seriously concerned because most of the people who are especially valuable to society do not adequately replace themselves in the next generation. I first observed this happening in the little town in which I grew up. By far the richest, most famous and most inventive individual died without issue. The founder of the local bank had three children but only one married. The operator of the largest mill, a princely man, had three children but none of them reproduced. One of the two physicians had one child; the other had none. The leading merchant had three beautiful daughters but none had children. Only one of all the civic leaders had as many as four reproducing children.

In college the faculty members whom I most admired almost invariably had meager families. After college, as I traveled about the country calling on physicians, the ones whom I regarded with the greatest respect and who, by and large, stood highest in their profession, usually had families of one or two children.

I began to accumulate information bearing on this phenomenon of the brighter and more competent people, on the whole, having small familes. In the course of years, I read every available writing which pertained to the matter.

In the 1960s I was drafting the manuscript of a book. It

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agreed in many of its aspects with earlier writings of Professor Raymond Cattell and I asked Doctor Cattell, then at the University of Illinois, if he would criticize the manuscript for me. This he did to its great benefit. He also communicated to his friend, Hermann J. Muller, the Nobel prize winner, that here was an impending book which was in close agreement with some of Muller's concepts concerning the dysgenic trends present in modern Western society. One of the proposals was the establishment of a Repository for Germinal Choice. The purpose of such a repository was to store sperm to be obtained from persons of eminent intellectual quality and good health. This then could be made available to married couples of good repute and of adequate economic means who wished to have a child but were prevented from doing so because of the husband's infertility. Doctor Muller expressed an interest in seeing the manuscript so I sent a copy to him at the University of Indiana in Bloomington. He and I also agreed on a meeting while he was on a lecture trip in southern California where I lived.

The pressure of his responsibilities gave Muller no opportunity to read the manuscript until just before he was scheduled to leave for California. This was a fortunate circumstance because had he read it earlier he would have canceled the appointment. When he did read it he sent off a very peppery note saying that he could see little good to come from our planned meeting, but that he would not break the appointment at so late a date.

When we met, the source of trouble soon became apparent. In the manuscript I described at some length the frequent massacre of aristocracies and of members of the bourgeois and the intelligentsia in the aftermath of communist revolutions. Doctor Muller was an avowed Marxist! He was not the rabble-rousing type but had strong sympathies for the proletariat. He agreed that vast internal genocide did take place in the U.S.S.R. but did not consider it part of communism. It was, in his words, Stalinism.

Years earlier, Doctor Muller had relinquished a position at the University of Texas and moved to communist Russia. But with the ascendency in Russia of Lysenko, a rabid environmentalist, the Mendelian geneticists in Russia began to disappear. This included even Doctor Muller's friend and associate, the great Vavilov, who had invited Muller to move to Russia. Vavilov died in Siberia.

I recall Doctor Muller's relating one evening how one of

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Stalin's secretaries got word to him that a meeting had been scheduled to determine how to deal with him (Muller). Muller, as a Mendelian, was an embarrassment to Lysenko and Stalin, but he could not simply be killed or sent to Siberia because he was American. Muller did not wait to learn what the decision would be. He took the next train out (to Poland I presume) and thence got to Edinburgh.

I have the strong impression that I was the first genuine full-fledged capitalist that Doctor Muller got to know really well. I was his first close contact with a member of a hated class. Dr. Muller's environment had been so purely academic that he had had no first-hand familiarity with American industry. Yet now he walked through a lens factory with me and saw hundreds of well-fed people industriously working away, and smiling or nodding at the owner as he went by. Some of the senior associates even addressed me as Bob or RG. Here Doctor Muller could sense a spirit of willing cooperation in a manufacturing enterprise, not the grinding exploitation he had been taught to expect. Here was a far more cheerful atmosphere than he had anticipated or than he had encountered in Russia. Also there were no lurking KGB spies.

He took dinner and spent an evening in my modest home. My wife and I had an automobile, air conditioning and other common perquisites of a capitalist society, but no servants, no lavish extravagances which members of the so-called oppressive class were said to display. I think we softened some of his more severe socio-political conceptions.

At any rate, he later wrote, saying: "Those two days with you were among the most delighful and constructive I have ever spent."

Communism vs. capitalism was the only difference between us and that occurred chiefly at first. Much of my manuscript dealt with the subject of human evolution and on that we were in full accord — even about human devolution and how to ameliorate it. We went over the manuscript hour after hour and day after day, word by word. It was a far more scholarly work when we finished. The result was the book *The Future of Man*.(1)

Of course one of the book's sections he liked best was that which discussed the establishment of selective sperm banks. Toward the end of our sessions he reverted to this subject, quite aside from the section in the manuscript. I made notes on that

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discussion. These read: "Hermann Joseph Muller and Robert Klark Graham, having had correspondence and discussions regarding the repositories advocated by Dr. Muller for storage of spermatozoa from outstanding humans, met in room 612 of the Huntington-Sheraton Hotel, Pasadena, California on June 5, 1963.

"During this meeting Dr. Muller mentioned that the cost of establishing a facility for storage of sperm at -191°C. was about $1,000 and the cost of maintaining same about $300 per year (for liquid nitrogen, etc.), following the techniques developed by J. K. Sherman, Ph.D. Hermann Muller then said to Robert Graham: 'Would you be willing to give one thousand dollars for this purpose?' The reply was: 'Yes.' Robert Graham subsequently agreed to contribute an additional $300 per annum to maintain the project as long as he was able and it was necessary for him to support it alone. During further discussion Graham stated that part or all of the initial fund would be made available as requested by Hermann Muller.

"Thereupon discussion was entered into regarding superlative individuals whose spermatozoa it would be desirable to store for future germinal choice. It was stipulated that high intelligence and cooperativeness were among the primary requisites of such individuals. The individuals listed by Dr. Muller as possibilities were: Julian Huxley, James F. Crow, James Watson, Harold Urey and Seymour Benzer. Robert Graham added the name of Hermann Muller, but Dr. Muller stipulated that his sperm not to be made available for use until 25 years after his death.

"After more discussion of various aspects of the undertaking, Robert Graham said: 'Let's put it over' to which Hermann Muller responded: 'Yes.' Thereupon the two shook hands and the project was launched." The original of this account is signed by Hermann J. Muller and Robert K. Graham.

In a three-page letter dated July 4, 1965, written by hand in Monrovia, California, Dr. Muller commented: "This project has never been attempted before and as you and I realize, it is a most important one." Despite his illness, which was unexpectedly long and severe, he wrote: "I am determined to go on with the project because I look on it as the most important work of my life." He ranked this even ahead of the research for which he received a Nobel award.

However, his illness and his responsibilities interfered with

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# QUESTIONAIRE SUBMITTED TO ALL DONORS

The Repository for Germinal Choice

Donor's Genetic Health

Please try to answer the following questions as accurately and completely as possible. However, if you have not heard of a disorder, you probably do not have it. Remember that no one is perfect.

Have you ever had any of the following:

| Yes | No | | Yes | No | |
|---|---|---|---|---|---|
| ( ) | ( ) | Asthma | ( ) | ( ) | Retinoblastoma |
| ( ) | ( ) | Drug Allergies | ( ) | ( ) | Strabismus (crossed eyes, one eye turned out) |
| ( ) | ( ) | Food Allergies | ( ) | ( ) | Deafness or Other Hearing Loss (Specify cause or diagnosis) |
| ( ) | ( ) | Hayfever | | | |
| ( ) | ( ) | Insect Allergies | | | |
| ( ) | ( ) | Cooley's Anemia or Thalassemia | ( ) | ( ) | Serious Dental Malocclusion |
| ( ) | ( ) | Hemophilia | ( ) | ( ) | Chronic Malabsorption Syndrome |
| ( ) | ( ) | Sickle Cell Anemia | ( ) | ( ) | Colon Polyps |
| ( ) | ( ) | Other Hemoglobinopathys or other anemia, (Pernicious, Spherocytosis, etc.) | ( ) | ( ) | Congenital malformation of Gastrointestinal Tract |
| ( ) | ( ) | Cancer of the Colon | ( ) | ( ) | Crohn's Disease (regional enteritis) |
| ( ) | ( ) | Leukemia | ( ) | ( ) | Pyloric Stenosis |
| ( ) | ( ) | Lymphoma | ( ) | ( ) | Ulcerative Colitis |
| ( ) | ( ) | Any other Cancer | ( ) | ( ) | Club foot |
| ( ) | ( ) | Congenital heart disease | ( ) | ( ) | Dwarfism |
| ( ) | ( ) | Atherosclerosis | ( ) | ( ) | Spina Bifida |
| ( ) | ( ) | Blood Lipid abnormality (Cholesterol, Triglyceride) | ( ) | ( ) | Congenital Hip Dislocation |
| ( ) | ( ) | High Blood Pressure | ( ) | ( ) | Abnormalities of Bone Growth and Development (Specify) |
| ( ) | ( ) | Stroke | | | |
| ( ) | ( ) | Other Cardiovascular disease | ( ) | ( ) | Abnormal Postural Positions |
| ( ) | ( ) | Learning Disability | | | |
| ( ) | ( ) | Migraine Headaches | ( ) | ( ) | Polydactyly (extra fingers or toes |
| ( ) | ( ) | Other severe or disabling headaches | ( ) | ( ) | Ankylosing Spondylitis |
| ( ) | ( ) | Any Chromosomal abnormality | ( ) | ( ) | Arthritis |
| | | | ( ) | ( ) | Dupuytren's Contracture |
| ( ) | ( ) | Cleft lip/and/or palate | ( ) | ( ) | Muscular Dystrophy (Specify type) |
| ( ) | ( ) | Blindness (Specify cause and diagnosis) | ( ) | ( ) | Muscle Wasting |
| ( ) | ( ) | Albinism | ( ) | ( ) | Myasthenia Gravis |
| ( ) | ( ) | Cataract | ( ) | ( ) | Myotonia |
| ( ) | ( ) | Color Blindness | ( ) | ( ) | Other Chronic Skeletal Disease |
| ( ) | ( ) | Eyesight deficiency (not correctable with glasses) | ( ) | ( ) | Ataxia |
| | | | ( ) | ( ) | Convulsive Disorder (Specify) |
| ( ) | ( ) | Glaucoma | ( ) | ( ) | Familial Spastic Paralysis |
| ( ) | ( ) | Severe refractive disorder | | | |
| ( ) | ( ) | Night Blindness | | | |

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Have you ever had any of the following:

| Yes | No | |
|---|---|---|
| ( ) | ( ) | Huntington's Chorea |
| ( ) | ( ) | Malignant Hyperthermia |
| ( ) | ( ) | Multiple Sclerosis |
| ( ) | ( ) | Neurofibromatosis |
| ( ) | ( ) | Tuberous Sclerosis |
| ( ) | ( ) | Have you ever suffered paralysis of a limb for an extended period of time? |
| ( ) | ( ) | Parkinson's Disease |
| ( ) | ( ) | Sensory Disturbance (for example, increased pain perception, unprovoked tingling, etc.) |
| ( ) | ( ) | Stuttering or other speech impediment |
| ( ) | ( ) | Tic |
| ( ) | ( ) | Tremor |
| ( ) | ( ) | Delusions of greatness or Omnipotence |
| ( ) | ( ) | Depression |
| ( ) | ( ) | Failing Memory |
| ( ) | ( ) | Mood Swings, from Euphoria to deep depression |
| ( ) | ( ) | Hallucinations |
| ( ) | ( ) | Hot or Violent Temper |
| ( ) | ( ) | Hysteria |
| ( ) | ( ) | Inability to Function Due to Emotional Upset |
| ( ) | ( ) | Phobias |
| ( ) | ( ) | Nervous Breakdown or Extreme Nervousness |
| ( ) | ( ) | Spells of Unprovoked Anxiety |
| ( ) | ( ) | Homosexual Tendencies |
| ( ) | ( ) | Suicidal Tendency or Attempts |
| ( ) | ( ) | Any Coffee Colored Spots of Skin about the size of a nickel, or lumps under the skin |

| Yes | No | |
|---|---|---|
| ( ) | ( ) | Birthmark |
| ( ) | ( ) | Eczema |
| ( ) | ( ) | Psoriasis |
| ( ) | ( ) | Vitiligo (areas of depigmentation) |
| ( ) | ( ) | Other Chronic Skin Disease (Specify) |
| ( ) | ( ) | Born with Solitary Kidney |
| ( ) | ( ) | Gout, Kidney Stones, or Hyperuricemia |
| ( ) | ( ) | Polycystic Kidneys |
| ( ) | ( ) | Progressive Kidney Disease |
| ( ) | ( ) | Hypospadias |
| ( ) | ( ) | Diabetes Mellitus |
| ( ) | ( ) | Ehlers-Danlos Syndrome |
| ( ) | ( ) | Marfan's Syndrome |
| ( ) | ( ) | Thyroid Disorder (Specify) |
| ( ) | ( ) | Lupus Erythematosis |
| ( ) | ( ) | Cystic Fibrosis |
| ( ) | ( ) | PKU (Phenylketonuria) |
| ( ) | ( ) | Galactosemia |
| ( ) | ( ) | Amyloidosis |
| ( ) | ( ) | Porphyria |
| ( ) | ( ) | Wilson's Disease |
| ( ) | ( ) | Alkaptonuria |
| ( ) | ( ) | Gauchers Disease or other Lipid Storage Disease |
| ( ) | ( ) | Exposure to mutagenic agents. For example: ( ) radiation, ( ) chemotherapy, ( ) other |
| ( ) | ( ) | Other Hereditary Disorder |

Give details of any psychosis or other mental disorder you have suffered. Specifically, state if you have ever received a diagnosis of Schizophrenia, Manic Depression or Chronic Recurrent Depression:_____

_____

Have you ever received any psychiatric treatment for other than above? Yes ( ) No ( ) If yes, give details:_____

_____

Are you at risk for any other physical or psychological condition, or disease that is thought to "run in your family"? Yes ( ) No ( ) If yes, please elaborate:_____

_____

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his coming to grips with some of the remaining decisions to be made regarding the Repository.

Following a year at the University of Wisconsin he returned to the University of Indiana at Bloomington. I shall never forget an evening spent with him and his wife, Thea, in their home there. Dr. Muller had recently delivered a long and brilliant address to the International Congress of Human Genetics in Chicago (1966). He was at the time so weak that he had to give the talk while sitting but the audience recognized the greatness of the speaker and gave him a resounding ovation. Later, however, two men whom Joe (Dr. Muller) regarded as bitter antagonists wrote critiques about his address, utilizing techniques which have been developed to diabolical levels within academic circles; that of damning with faint praise and of raising far-fetched questions about some of his most insightful statements. The invidious comments of those two men so upset Joe that whenever he spoke about them that evening he became quite agitated and had to retire to a bedroom and lie down until his heart permitted him to return to table. This happened two or three times. I left early so as not to give him further occasion to discuss this upsetting subject. A few days later he was hospitalized for the final time. It is my private opinion that those two antagonists hastened the demise of this great man.

Shortly after our signing the Agreement in 1963 I had procured the liquid nitrogen equipment for storage of semen, modified a walk-in wine vault in my home and had a Nobelist ready to donate semen. I also had the head of staff of a Pasadena hospital, a board certified gynaecologist, ready to assist with medical aspects. But Joe was not yet prepared to proceed. He needed to think through certain implications and potential repercussions, including those of his 25 year proviso.

He asked that I take no further steps until he could recover strength enough to participate actively again.

But he did not recover. Instead, he died. Consequently the whole project remained in a state of suspended action for about 10 years. By then I had more means and more leisure and, finding no one else moving to carry out Joe's concepts, decided to begin collecting sperm donations from Nobelists in science. There are certain elitist implications with this category but we did not know of a better selection with which to start.

The Repository for Germinal Choice functions in the same way as artificial insemination is commonly practiced, except in

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accordance with the concepts of Dr. Hermann J. Muller:

1) The rigorously screened donors are unpaid and contribute solely out of their willingness to increase the distribution of genes which helped to make them outstanding in their lifetime.

2) The germinal donations (semen) are sealed in ampules or straws and kept under liquid nitrogen in an insulated vessel which is itself sheathed in lead . Donations to the Repository are thus protected from mutagenic radiation. They may be kept for many years.

3) The recipients (female) are genetically selected by a medical panel. They are bright, healthy young women, whose husbands are infertile but do not wish their wives to be denied motherhood. Recipients and their husbands may choose from written descriptions of several donors the one whose characteristics they would most like to have in the father of their child. (Hence the term, 'germinal choice'.) Thus it offers to qualified couples a new resource — the opportunity to choose the specific father of their child or children, and to do so from among several of the most creative scientists of our time.

It was my privilege to have joined with Dr. Muller in organizing the first repository to carry out his concept and it is my privilege to carry it forward. The first functioning repository is in Escondido, California.

Semen donations are categorized by every knowable hereditary characteristic, but not by name or identity of donor. Hence recipients know the significant characteristics of the germinal father, but never his identity. Donors never know the identity of the recipients. Complete anonymity is regarded as not only desirable but essential.

To be accepted, donors must be free of all the more than 200 heritable impairments listed in the rigorous questionnaire. In addition, their blood tests must be negative for all the standard concerns plus hepatitis and the venereal diseases, including AIDS.

Most Nobelists did not respond, but a few returned completed questionnaires. Others agreed to participate after I made a visit to their office. With these volunteers we began building a reservoir of frozen sperm. We made repeat collections. Our procedure was to go to their city, with a microscope and portable Dewar (a large vacuum bottle). Then we could obtain the donation, do a sperm count, fortify the semen with a freezing protectant and promptly preserve it under liquid nitrogen.

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I describe this at some length in the hope that others will plan to set up sperm banks of superlative males.

One of Dr. Muller's latest decisions was to make half of a donor's contributions available for current use and retain the other part for 20 years, this last so as to gain perspective on the worth of his contribution to society.

When we had built a good reservoir of donations, I wrote an article for a Mensa publication. As a result of the response we began to supply Nobelist sperm to women who were young, bright and married, but whose husbands were infertile.

To date more than 40 Repository youngsters have been born. While they are too young for conclusive testing, their vocabularies average twice the expected. They are all so very bright, healthy and happy that they promise to confirm in every significant respect the sanguine expectations which Doctor Muller held.

FOOTNOTE

(1) *The Future of Man.* Robert Klark Graham, Christopher Publishing House. North Quincy, Massachusetts, 1970. Library of Congress Catalog Card 74-112341, ISBN 8158-0033-7.

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# INTELLIGENCE AND NATIONAL ACHIEVEMENT

*Editor*
Raymond B. Cattell

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# ACHIEVEMENT AMONG GERMAN JEWS BORN DURING THE YEARS 1785-1885

GERHARD FALK and VERN BULLOUGH
*State University College at Buffalo*

The authors replicate earlier surveys of eminent achievers in Fourteenth Century Florence and Eighteenth Century Scotland, and here present a statistical profile of prominent Jews born in Nineteenth Century Germany.

Certain peoples and areas seem to have periods of greater intellectual and creative achievement than others. Coming readily to mind are Athens during its Golden Age, Renaissance Florence, Elizabethan England, Seventeenth Century Holland, and Eighteenth Century Scotland. There are many others. In a series of ongoing studies, the second author of this study has attempted to isolate some of the sociological variables involved in intellectual and creative achievement, both in terms of individuals and in terms of periods. (1) The research started with a study of Eighteenth Century Scotland, the so-called Golden Age of Scotland. The variables found important in Scotland were then applied to Florence in the *quattrocento* (Fifteenth Century). There was a remarkable similarity in findings between Fifteenth Century Florence and Eighteenth Century Scotland. Both societies were chosen because sources were available; the number of achievers was limited because the population of the societies themselves was not very large. Scotland had about a million people and Florence not many more during the time frame of the study. Though source materials were not as plentiful for Florence as for Scotland, and the Florentine study was more incompelete than the Scottish one, the similarities seemed so marked that a third phase of the study was projected to cover another creative minority group, Jews born in Germany during the Nineteenth Century.

Since Germany was a remarkably creative and vigorous culture in that period, the number of German achievers would be radically disproportionate to those in the two earlier studies, as was the population of Germany itself. It was therefore decided to study a subgroup within Germany, a more or less identifiable minority, to see if the same kind of variables existed among the subgroup as among the dominant groups in the other studies. The group chosen, Jews born in Germany, was not only identifiable but would, superficially at least, be dif-

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ferent from achievers in the other societies since they had recently been "emancipated" as a result of the Napoleonic Wars. Even though there was stigma attached to being Jewish, it was hypothesized that the same sociological variables would be significant.

Achievement in this and previous studies has been carefully and uniformly defined since, in a sense, the mass murderer could be regarded as a creative achiever and so might the mother who gives birth to 14 children. While such examples might seem far-fetched and, therefore, easily dismissed, it is not so easy to distinguish achievement from what could be called success. Successful business, religious, political, and military leaders are achievers and obviously often have had to *have intelligence and creativity to arrive at the positions they* held. Such individuals were excluded from the definition of achievement in these studies unless they had significant intellectual and creative achievements in addition to their administrative or managerial roles. Historically, we also know less about the successful businessman or administrative leader than we do about intellectual and creative achievers. Another reason for exclusion was a more objective one. Preliminary studies had indicated that many, if not most, of the significant members in what might be called the "successful" administrative and management groups in the period before 1800 came from the upper income groups, and their high position was not so much an individual achievement but a family one. Instead, we defined intellectual and creative achievement as those who had written, painted, composed, created, invented, or discovered something which society, then or later, regarded as important.

### Selection

The names of those individuals to be studied were selected from standard reference works in the various disciplines, as well as from biographical dictionaries of the area and/or period being studied. We did not rely upon any previous list of achievers to get the sample, since existing lists of achievers were not as complete as we felt they should be. The origin of most other lists can be traced back to Sir Francis Galton,(2) who attempted to isolate and describe individuals with great natural endowment. Galton used the term genius to describe his individuals, something that is more difficult to determine than the broader term "achievement." Recent research on contemporary achie-

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## LIST OF INDIVIDUALS SELECTED FOR INCLUSION IN THIS STUDY

### MEDICINE

| | |
|---|---|
| Bloch, Iwan | Sex research , Social Diseases,Dermatology |
| Cohn, Hermann | Opthalmology,Childrens Eyesight |
| Cohnheim,Julius | Greatest pathologist of his day |
| Döblin, Alfred | Neurologist,psychiatrist and novelist |
| Ebstein,Wilhelm | Diseases of the kidney, history of medicine |
| Edinger,Ludwig | Central nervous system;"Edingers Nucleus". |
| Finkelstein,Heinrich | Cured alimentary fever;infants diseases. |
| Fränkel,Albert | Experimental pathology; diseases of lung and heart |
| Halberstädter,Ludwig | Virus of trachoma; thorium treatment of cancer |
| Hamburger,Carl | Opthalmology; glaucoma treatment |
| Heims-Heyman,Paul | Laryngology and rhinology |
| Henoch,Eduard | The first pediatrician-made child medicine a special and separate endeavor. |
| Henschel,August Wilhelm | History of medicine; sexuality of plants |
| Heymann, Bruno | Microbiologist and discoverer of diphtheria anti-bodies. |
| Hirsch, Rachel | Discoverer of the "Rachel Hirsch effect" in kidney; the only woman and only Jew ever to teach at the Medical School of the U. of Berlin |
| Hirschberg,Julius | History of Opthalmology;use of the hand magnet |
| Hirschfeld,Magnus | First sexologist; neurologist and author |
| Hollander,Eugen | Pioneer in cosmetic surgery |
| Israel,James, | World renowned kidney surgeon;founded journal |
| Jacobi,Abraham | Childhood diseases and infant feeding |
| Klemperer,Georg | Cancer research |
| Koch,Richard | History of medicine |
| Lesser,Edmund | Social diseases;dermatology and genital diseases |
| Leipmann, Hugo | Psychiatry and neurology;physical basis of psychic states. |
| Neisser,Albert | Dermatologist; discovered gonococous |
| Neumann,Salomon | Public hygiene and social statistics |
| Oppenheimer,Zacharias | Neurology and poison expert |
| Peppenheim,Samuel Moritz | Digestion and genital studies |
| Pick,Ludwig | Gynecological and pathological studies |
| Pinkus,Felix | Pathology of the skin;syphilis |
| Poll,Heinrich | Nervous system and anatomical studies |
| Proskauer,Bernhard | Industrial hygiene |
| Remak,Ernst Julius | Electro-diagnostic of neuritis |
| Romberg,Moritz | Neuropathology; "Physician to the poor." |
| Rosenbach,Ottomar | Functional diseases of the nervous system |
| Saenger, Max | Gynecological operations and obstetrics |
| Schiff, Moritz | Pioneer physiologist;functions of the brain |
| Semon,Sir Felix | Laryngologist and founder of the society |
| Semon,Richard | Comparative morphology |

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## WRITING

### Drama or Theater

Arendt, Olga
Fulda, Ludwig
Kaiser, Georg
Olden, Hans
Phillippi, Felix
Sternheim, Carl

### Novels and Poetry

Auerbach, Berthold
Feuchtwanger, Lion
Heine, Heinrich
Hermann, Georg
Heymann, Walter
Hirschfeld, Georg
Lasker-Schueler, Else
Lewald, Fanny
Lewisohn, Ludwig
Lissauer, Ernst
Wasserman, Jakob
Wolfskehl, Karl

### Literature

Jacoby, Leoppld
Phillipson, Phöbus
Steinheim, Solomon
Theilhaber, Felix

### Journalism

Bernhard, Georg
Eisner, Kurt
Elias, Julius
Fleischer, Richard
Friedländer, Max
Heimann, Hugo
Herzog, Wilhelm
Hess, Moses
Jacobs, Montague
Jacobsohn, Siegfried
Lessen, Ludwig
Lessing, Theodor
Mühsam, Erich
Nathan, Paul
Otterbourg, Marcus
Reuter, Paul
Stein, August
Weil, Gustav
Wolff, Bernhard

### Essayss and Criticism

Eloesser, Arthur
Frank, Leonhard
Heimann, Moritz
Jacobson, Eduard
Kerr, Alfred
Lasalle, Ferdinand
Lichtheim, Richard
Loewe, Heinrich
Olden, Rudolf
Perles, Rosalie
Riesser, Gabriel
Ring, Max
Samoscz, David
Sanders, Daniel
Schiff, Hermann
Trietsch, David
Wolff, Theodor
Zinndorg, Heinrich

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Law

Alsberg, Max
Bamberger, Ludwig
Elstätter, Moritz
Frank, Ludwig
Frensdorff, Ferdinand
Friedberg, Heinrich
Gans, Eduard
Haase, Hugo
Hachenburg, Max
Hayman, Franz Karl
Kaskel, Walter
Lasker, Eduard
Lenel, Otto
Levy, Ernst
Levitan, Solomon
Marx, Adolf Bernhard
Moses, Adolph
Neumeyer, Karl
Oberneck, Hermann
Oppenheim, Lassar
Pinner, Albert
Preuss, Hugo
Radin, Max
Reinganum, Maximilian
Rosenfeld, Kurt
Rosin, Heinrich
Rubo, Ernst Traugott
Rubo, Julius
Salomon, Eduard
Simon, Heinrich
Simson, Martin
Stahl, Friedrich Julius
Staub, Hermann
Strause, Meyer
Sulzberger, Mayer
Wilda, Wilhelm Eduard

Politics

Jacoby, Johann
Jaffe, Edgar
Kohn, Albert
Ree, Anton
Reichenheim, Leon
Singer, Paul
Veit, Moritz
Wiener, Alfred
Witting, Richard
Wunderlich, Frieda

Literature, Linguistics and Philology

Fraenkel, Siegmund
Geiger, Eliezer Solomon
Goldschmidt, Siegfried
Herrmann, Max
Horovitz, Josef
Norden, Eduard
Oppert, Julius
Peiser, Felix
Priower, Otto
Robert-Tornow, Walter
Schindler, Bruno
Schipper, Jakob
Schloessinger, Max
Sobernheim, Moritz
Somsen, Felix
Spegelberg, Wilhelm
Stenthal, Hayim
Titkin, Heinrich

Philosophy

Cassirer, Ernst
Cohen, Hermann
Freudenthal, Berthold
Freudenthal, Jacob
Joel, Karl
Leibert, Arthur
Marx, Karl
Nelson, Leonhard
Reinach, Adolf
Richter, Raoul Michael
Sammter, Asher
Stahl, Friedrich
Weiner, Alfred

Military

Proskauer, Adolph
von Mossner, Walther

Chess

Tarrasch, Siegbert

Art Journal Publisher

Freundlich, Otto

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## MATHEMATICS

Aronhold,Siegfried Heinrich
Bernstein,Felix
Borchardt,Carl Wilhelm
Dehn, Max
Einstein,Ferdinand
Fuchs, Immanuel Lazarus
Gundelfinger, Siegmund
Hamburger, Meyer
Hausdorff,Felix
Hurwitz,Adolf
Jacobi,Karl Gustav
Joachimsthal,Ferdinand
Kronecker, Leopold
Landau, Edmund
Lipschitz,Rudolf
Netto, Eugen
Oppenheim,Samuel
Pasch,Moritz
Rosenhaim,Johann
Schoenfliess,Arthur
Silbergleit,Heinrich

### Architecture

Oppler,Edwin
Rosengarten,Albrecht
Wechselmann,Ignac

### Painting

Bendemann,Eduard Julius Friedrich
Edel, Edmund Albert
Heine,Thomas , Theodor
Jacob,Julius
Levy,Rudolf
Liebermann,Max
Lismann,Herman
Nussbaum,Jacob
Oppenheim,Moritz
Oppler,Ernst
Schlesinger,Wilhelm
Schuelein,Julius
Spiro,Eugen
Steinhausen,Wilhelm
Veit,Phillip
Weyl,Mose
Wolfthorn,Julie

## MUSIC

### Conducting

David,Ernst Viktor
Gilbert,Jean
Jessel,Leon Klemperer,Otto
Levi,Herrmann
Schindler,Kurt
Spicker,Max
Stern,Julius
Walter, Bruno

### Composing

Damrosch,Leopold
Franck,Eduard
Fried,Oskar
Judassohn,Solomon
Kahn,Robert
Mendelssohn,Felix
Moszkowski,Moritz
Offenbach,Jaques
Schlesinger,Siegmund

### Musicology

Dehn, Siegfried
Holländer,Alexis
Istel,Edgar
Leichtentritt,Hugo
Sachs,Kurt

### Sculpture

Oppler,Alexander
Plessner,Jacob
Rheinhold,Hugo
Sussmann-Hellborn,Louis
Wagner,Siegfried

### Theater Director

Seeler,Moriz

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## PHYSICAL SCIENCES

### Astronomy

Archenhold, Friedrich
Goldschmidt, Hermann
Goldstein, Eugen

### Bacteriology

Cohn, Ferdinand Julius
Falck, Richard
Friedmann, Ulrich
Wassermann, August von

### Biology

Goldschmidt, Richard
Henle, Jakob
Loewi, Otto
Moszkowski, Max
Oppenheimer, Carl
Sachs, Julis

### Physics

Aron, Hermann
Auerbach, Felix
Born, Max
Cohn, Emil
Einstein, Albert
Franck, James
Frankenheim, Moritz
Goldschmidt, Viktor
Graetz, Leo
Lillenthal, Otto
Michelson, Albert
Ries, Peter
Ruedenberg, Reinhold

### Physiology

Bernstein, Julius
Hermann, Ludimar
Lesser, Ernest
Munk, Hermann
Munk, Manuel
Rosenthal, Isidor
Valentin, Gabriel

### Pharmacy and Pharmacology

Ellinger, Alexander
Eulenburg, Albert
Jaffe, Max
Urdang, Georg

### Chemistry

Caro, Heinrich
Ehrlich, Paul
Frank, Adolph
Gabriel, Siegmund
Haber, Fritz
Hertz, Richard Leopold
Pinner, Adolf
Sackur, Otto
Schiff, Hugo
Strauss, Eduard
Wallach, Otto
Warburg, Otto
Willstätter, Richard

Herrmann, Albert

### Engineering

Berliner, Emil
Goldschmidt, Rudolf
Rathenau, Emil
Rathenau, Walter
Ries, Elias Elkan
Reis, Phillip
Stenmentz, Charles

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## SOCIAL SCIENCES

### Anthropology

#### Archeology

Hirschfeld, Gustav
Obermayer, Jakob
Oppert, Gustav
Saalschütz, Max

#### Cultural Anthropology

Boaz, Franz
Sapir, Edward

### Economics

Liefmann, Robert
Oppenheimer, Franz

### Geography

Phillipson, Alfred

### History

Gebhardt, Bruno
Geiger, Ludwig
Goldschmidt, Adolf
Graetz, Heinrich
Gundolf, Friedrich
Jost, Isaac
Klemperer, Viktor
Lefman, Solomon
Levinson, Wilhelm
Neander, Johann August
Pagel, Julius
Phillipson, Martin

### Psychology

Katz, David
Lazarus, Moritz
Lippmann, Otto
Münsterberg, Hugo
Ries, Ludwig
Rubino, Josef
Seligmann, Sigmund
Stern, Alfred
Stettiner, Richard
Strich, Fritz
Sulzbach, Abraham
Swarzenski, Georg
Witkowski, Georg
Zunz, Leopold

## THEOLOGY

Theologian but not a Rabbi

Baer, Seligmann Isaac

### Rabbis

Adler, Hermann
Adler, Nathan Markus
Back, Leo
Bamberger, Seligman
Geiger, Abraham
Hildesheimer, Israel
Hirsch, Samson Rafael
Hirsch, Samuel
Joel, Manuel
Kalischer, Zvi Hirsch
Kohler, Kaufman
Lilienthal, Max
Munk, Ezra
Phillipson, Ludwig
Rieger, Paul
Ritter, Immanuel
Rosenau, William
Rosenthal, Ludwig
Rosin, David
Rülf, Isaac
Sachs, Michael
Salfeld, Sigmund
Scheftelowitz, Isidor
Schott, Leopold
Seligman, Caesar
Stein, Leopold
Wiener, Max

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vers suggests that while there is some correlation between intelligence and creativity, the relationship declines or even disappears above an IQ of about 120.(3) Building upon Galton's efforts was Cox.(4) She limited herself to 301 individuals from 16 nations over four centuries and did not attempt to be as complete as we felt was necessary.

Taking a different tact was Kroeber,(5) who developed a sample of over 5,000 creative individuals in different categories for the period 700 B.C. to 1900 A.D. Still, his list is by no means exhaustive, and though there can be little debate about the better known individuals on his list, there is room for great debate over why some of the lesser known individuals were included and other were not. For example, the three groups and time periods we have studied included more than 1,100 individuals which would be more than 1/5 of Kroeber's list in about 1/1000 of the areas, cultures, and time periods he included. Kroeber, however, was not concerned with individual achievers, but instead used his individuals as indices, not agents of periods of greater or lesser creativity. He took as his task the tracing of patterns of creativity in all civilizations, trying to portray configurations in time, in space, and in degree of achievement.(6)

What Kroeber did from an anthropological point of view, Pitirim Sorokin (1937-1941) attempted to do in historical sociology.(7) Though both Kroeber and Sorokin started with different premises, there is considerable correlation between their lists since Sorokin, like Kroeber, was not concerned with the creative or the achieving individual per se. Sorokin (1950) agreed with Kroeber on the clustering of geniuses. Since Kroeber and Sorokin completed their studies, numerous others have added to the type of studies that they were doing (Sorokin, 1957) and attempted to refine their methods or suggest changes.(8) Most studies continued to rely upon Kroeber's selection of individuals, and though the computer has allowed us to give more sophisticated analysis of his data, it is still the same data that is being analyzed.

## Earlier Findings

The list of Kroeber and Sorokin and others, however, emphasize that there is general agreement that certain periods and cultures seem to give birth to more significant achievers than others. Some have assumed that the proclivity to genius was

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TABLE 1

Distribution of Achievers by Decade of Birth

| Level of Fame | DECADE 1785-1794 N=8 | %=100 | 1795-1804 N=17 | %=100 | 1805-1814 N=33 | %=100 | 1815-1824 N=26 | %=100 |
|---|---|---|---|---|---|---|---|---|
| World | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 |
| Major | 2 | 25 | 0 | 0 | 4 | 12 | 3 | 12 |
| Others | 6 | 75 | 17 | 100 | 29 | 88 | 22 | 84 |

| Level of Fame | DECADE 1825-1834 N=34 | %=100 | 1835-1844 N=33 | %=100 | 1845-1854 N=42 | %=100 | 1855-1864 N=45 | %=100 |
|---|---|---|---|---|---|---|---|---|
| World | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 |
| Major | 1 | 3 | 3 | 9 | 4 | 10 | 4 | 9 |
| Others | 33 | 97 | 30 | 91 | 37 | 88 | 41 | 91 |

| Level of Fame | DECADE 1865-1874 N=70 | %=100 | 1875-1884 N=67 | %=100 |
|---|---|---|---|---|
| World | 0 | 0 | 1 | 2 |
| Major | 9 | 13 | 8 | 12 |
| Other | 61 | 87 | 58 | 86 |

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probably randomly distributed in populations, and that the differential rate of accomplishment from one period to another or between societies must necessarily be related to cultural factors. Others have argued the role of heredity in determining human abilities and believe that this may differ between populations. However, it is agreed that even the best endowed individuals cannot succeed without favorable environmental and cultural conditions.

Florence Kluckhohn(9) (1961) has attempted to distinguish the value system of various cultures as they related to achievement, as did David McClelland (1961).(10)

Many of these variables, if McClelland is correct, relate to economic development and social structural factors which have been explored by a number of writers.(11) In a pioneering study, Joseph Schneider(12) (1938) examined the background of eminent Englishmen born between 1400 and 1850. He found that social class origins and a variety of cultural and social qualities tended to be associated with achievement by the individual. In earlier studies of Eighteenth Century Scottish achievers and Fifteenth Century Florentine achievers, similar findings were made.(13) An overall profile of the Eighteenth Century Scottish achiever would indicate that he was born in an urban parish, his parents belonged to the Church of Scotland, he lived or was educated in the economically most advanced section of Scotland, he belonged to the upper middle class he had three or four siblings, attended the university, and lived to be approximately three score and ten years of age. The Florentine achiever in the Fifteenth Century was very similar, although there were more aristocratic families than in Scotland. The age of death of the Florentine achiever was in the sixties rather than in the seventies on the average, but still, in terms of his contemporaries, he was long-lived. Length of schooling turned out to be significant in Florence, just as it was in Scotland. Some of the other variables, such as number of siblings, were not available in the source materials.

## Methodological Note

The present study is based on the biographies of 375 individuals who were born in the German Empire as defined by the census of 1905.(14) All members of this group were born during the years 1785 through and including 1885. The 375

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TABLE 2

Age at Death

| AGE AT DEATH BY DECADE: UNKNOWN | INCL. AGE 40 | AGE 41-49 | AGE 50-59 | AGE 60-69 |
|---|---|---|---|---|
| 10 | 10 | 19 | 45 | 101 |

| AGE 70-79 | AGE 80-89 | Age 90 or MORE | TOTAL |
|---|---|---|---|
| 119 | 65 | 6 | 375 |

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persons included in this study are not a sample. Instead they constitute the entire group of German-Jewish achievers as we define "achiever" for this study.

During the century here under consideration, there were of course, millions of people living in countries other than Germany whose prime language was German. Thus, we deliberately excluded from this study such famous achievers as Sigmund Freud — who was born in Bohemia, which was then a province of the Austrian Empire. We also excluded Jewish achievers born in Switzerland, the Netherlands or Poland, all countries with German-speaking populations.

We began by using names of achievers who are listed in *Die Neue Deutsche Biographie*.(15) This encyclopedic biography is an excellent source regarding almost all of the factors in which we are here interested. However, it has only been published through the letter "L". Therefore we could not use it in connection with half of our subjects. In addition to the biographies of Jewish women and men in that German source, we also used *The Jewish Encyclopedia*,(16) *The Universal Jewish Encyclopedia*(17) *The Encyclopedia Judaica*,(18) and *The Dictonary of Scientific Biography*.(19) With the exception of *Die Neue Deutsche Biographie*, however, these sources seldom mention any of those factors which are the basis of the present analysis. Thus, mothers of achievers were rarely mentioned. The same holds true of other relatives, particularly siblings. Since we sought to include such factors as social class, occupation, religious affiliation, etc., we found it necessary to seek this additional information in biographies and autobiographies published in the German language. We also consulted journal articles, biographical sketches and obituaries published in the *New York Times,* and elsewhere. It should be noted here that almost all biographical sketches published in professional journals deal only with the professional achievements of the subjects and generally say nothing about the private lives of the subjects. It is for these reasons that we were not able to obtain all of the information we sought concerning all of our 375 subjects. Thus, complete information concerning our subjects was obtained in only 13% of our biographies.

The following social factors were analyzed concerning as many of our subjects as could be included in each tabulation.

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TABLE 3

Birth Provinces
of Subjects in this Study

| BY REGION: | EASTERN | WESTERN | NORTHERN | SOUTHERN | TOTAL |
|---|---|---|---|---|---|
| No. & Percentage of Subjects | 188(52%) | 64(18%) | 44(12%) | 64(18%) | 361(100%) |
| German Empire Population 1905 | 14,642,295 | 11,987,861 | 12,190,643 | 20,241,607 | 59,062,406 |
| % of Population | 26% | 21% | 21% | 32% | 100% |
| Differences between % of Subjects and Total Population | -26% | +3% | +9% | +14% | 0 |

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Only six women were included in our study simply because we found only six women in all of the sources we used as a guide who had achieved sufficient eminence in the academic or artistic world. This is of course not surprising, considering the status of women in the Nineteenth Century, not only among German Jews but in all countries and among all religious groups. Women constitute only 1.6% of our subjects. None were included in the group considered to have attained world eminence, nor were any of the six found among the group considered to have attained "major" eminence in their field of endeavor.

### Decade of Birth and Age at Death

A steady increase in the number of eminent achievers is visible in our group of 375. Thus, only 2.1% of the group was born in the decade 1785-1794. However, in the last decades, i.e., 1865-1874 and 1875-1885 (eleven years) 18.7% and 17.9% respectively were born. This is not surprising inasmuch as the German Jewish population had by those years made many adjustments to their condition to permit them to achieve in the areas here studied. For example, it was very common for German Jews to convert to a Christian denomination in order to be admitted to universities or to their faculties. Since government appointments were similarly closed to believing Jews in most instances, conversion was sought also to attain government posts.

Another explanation for this increase in attainment in the later decades of this study was the entrance of many Jewish Germans into the field of medicine and science. Jews were seldom barred from practicing medicine and this profession consequently became popular with achieving Jews following its rapid expansion at the end of the Nineteenth Century.

In view of the average age at death in Nineteenth Century Germany, it is of greatest significance that fully 56% of our achievers lived to be 70 years of age or more. This was a high age at a time when average life expectancy in Germany was only 35-58, i.e., 37 years at birth.(20) It is interesting that the modal age was 78, including 19 persons. The average age at death was 67 years, constituting a life expectancy 55% greater than that of the overall population of Germany. From this unusual long life attainment we may conclude that either long-lived persons achieve more because they enjoy more years of

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TABLE 4

Size of Birth Communities

| Size of Communities | 150,000 or More | 5,000-149,999 | 4,999 or Less | TOTAL |
|---|---|---|---|---|
| %of Subjects in this Study | 51.4 | 37.5 | 11.1 | 100 |
| Size of Community | 100,00 or More | 5,000-100,000 | 5,000 or Less | |
| % of Prussian Population in 1900 | 11% | 27% | 62% | 100 |

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life in which to become achievers, or achievements, as well as their long life, are both caused by the same factors. We find the latter to be the case, particularly because fully 73.1% of our achievers came from the upper or upper middle class.

### Birth Province

Fully 35.8% of our subjects were born in the provinces of Brandenburg and Silesia. This is important because Berlin is located in Brandenburg, and Breslau in Silesia. Both cities had a large Jewish population because both were located near the Polish border and received many Jewish immigrants from all the countries to the east of Germany. It is our contention that a good number of the so-called German Jewish achievers were in fact persons who had Polish or other Eastern European parents. In this connection, it is significant that almost 10% of all Prussian citizens claimed Polish as their mother tongue in the Prussian census of 1900 (D. Muttersprache) and that more than 11% of that population spoke languages other than German as their mother tongues.

It is evident that the Eastern provinces of the German Empire were considerably over-represented among our subjects and that the Southern provinces, notably Bavaria, were heavily under-represented.

### Population of Birth Place

Over half of the subjects in this study came from communities whose population was greater than 150,000. Of these, more than half, constituting better than 27% of the entire group, came from cities of more than 500,000 population, notably Berlin, Breslau, Hamburg, and Frankfurt. The remainder were mostly born in medium-sized communities and only 11% came from small towns or villages. This could be compared to the general Prussian population for the year 1900 as shown in Table 4.

It is remarkable that the German-Jewish achievers studied here had exactly the opposite community origins as would have been true of a random sample of the German population. Thus, only 11% of Prussians came from large cities, while 62% lived and were born in towns of less than 5,000 persons. Since Prussia had more than half the German population at the time, it seems reasonable to assume that the total population distribution figures for all Germany did not differ greatly from the

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TABLE 5

Siblings in the Family of Achievers

Number of Children in the Family

| Level of Fame | Only Child | | 1-2 Sibs | | 3-4 Sibs | | 5-6 Sibs | | 7-8 Sibs | | 9 or More | | Several---Number Not Known | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N=6 | %=100 | N=34 | %=100 | N=23 | %=100 | N=6 | %=100 | N=5 | %=100 | N=5 | %=100 | N=3 | %=100 |
| World | 0 | 0 | 1 | 3 | 1 | 4 | 1 | 17 | 0 | 0 | 0 | 0 | 0 | 0 |
| Major | 2 | 33 | 10 | 29 | 5 | 22 | 1 | 17 | 0 | 0 | 3 | 60 | 0 | 0 |
| Others | 4 | 67 | 33 | 68 | 17 | 74 | 4 | 66 | 5 | 100 | 2 | 40 | 3 | 100 |

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Prussian figures. The heavy concentration of Jewish achievers in German cities was caused both by economic and socio-religious and educational factors. That is to say, that economic and socio-religious factors tended to encourage Jews to group themselves in cities, and that, in addition, those who sought employment of a kind that necessitated an academic background had to live in such cities.

### Siblings and the Family

More than 7% of our achievers were only children. 41.5% had 1-2 sibs so that nearly 49% came from homes with three children or less. More than three fourth of all achievers, i.e., 76.8% had four siblings or less. This means that our achievers came from smaller families than were common in Nineteenth Century Germany. The presence of sibs could only be determined in 82 of our achievers, i.e., 22%.

Only 63 biographies yielded information concerning the place of the subject in his family. This constitutes a sample of 16% of all our cases. Of these, two were oldest sons and had older sisters. Twenty-nine were oldest sons and had no oldest siblings. Ten were the middle child. One was the youngest son and had a younger sister and twenty-one were the youngest child.

We consider that 16% is too small a sample to tell us anything about the impact of the place in the family upon the attainments of our achievers. There are numerous studies, mainly reported by psychologists, which contradict one another concerning the influence of birth order on achievement. Thus, McClellan (10) reports that some studies indicate higher achievement for first born children, while others claim that younger children achieve more than older children or only children. Each study cited promotes different reasons for these conclusions leaving us in doubt concerning birth order influence and the various claims made for it.

### Religious Affiliation

Since this study concerns Jewish achievers born in Nineteenth Century Germany, it is of course not surprising that over 90% of our subjects were affiliated with Judaism (N = 340). That 10% who had become affiliated with various forms of Christianity or had no religious affiliation whatever, was in fact not unusual. It must be remembered from our foregoing

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TABLE 6

Religious Affiliation of Achievers

N=375

| Religion | No | % | Major or World Eminence | Others | All |
|---|---|---|---|---|---|
| Judaism | 340 | 91 | 35 | 305 | 340 |
| Converted to Christianity | 28 | 7 | | | |
| Protestants | 11 | | | | |
| Catholics | 12 | | 6 | 29 | 35 |
| Other Christians | 5 | | | | |
| Left Judaism But Did Not Convert | 6 | 1.6 | | | |
| Never Had Any Religion | 1 | .4 | | | |
| Total | 375 | 100.0 | 41 | 334 | 375 |

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exposition that higher education and appointments to academic or government posts frequently depended on at least formal conversion of a Jewish applicant to Christianity. The proportion of converts is also rather low when we consider that one fourth to one third of all marriages involving Jews had a non-Jewish partner.

### Occupation and Social Class

In this study we have used occupation of the subject, the parents of the subject and the spouses of the subject as the means of making class identification.

We began by reviewing the occupations of our subjects' parents, i.e., almost always their fathers, seldom their mothers. We had two reasons. First, occupation of the father and social class were almost identical in the Nineteenth Century, both in Europe and elsewhere, and second, women seldom worked outside the home. Thus, fully 94.2% of the 224 mothers of our subjects whom we could identify were housewives. It is for this reason that only 6 of our subjects were females. Thus, the occupation of fathers determined the life chances of sons and the marriage chances of daughters.

We succeeded in finding the occupations of 222 fathers of our subjects. This constitutes 59% of our group. Of these, almost 60% of all fathers of achievers were engaged in business. 44.6% were merchants, 8.1% were bankers, 5.4% were industrialists and 1.8% executives. This occupational distribution is a reflection of German-Jewish occupational distribution in general during the Nineteenth Century, but contrasts sharply with the occupational distribution of the non-Jewish German population at that time.

One of the differences between the fathers of our achievers and the German population as a whole was that only 3.6% were employed in domestic service, compared with 8% nationwide. It is striking that business and the professions occupied the fathers of achievers almost entirely, while farming and industrial work, which occupied 75% of the general German population was very unusual among Jews and hence among the fathers of our achievers.

The occupations of mothers of achievers was available to us in 224 cases. This means that over fifty of our achievers did not mention their mothers in their autobiographies or that their biographers, whether in an encyclopedia or elsewhere,

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TABLE 7

Occupational Distribution

Fathers of Achievers and the Jewish Population and the Non-Jewish Population of Germany in the Nineteenth Century.[21]

| Type of Occupation | % of German Population, 1895 | % of Jewish Germans, 1895 | % of Fathers of Achievers |
|---|---|---|---|
| Business | 5.3 | 59.8 | 59.9 |
| Traffic (Railroads) | 5.3 | 5.4 | |
| Farming | 37.5 | 1.6 | 0 |
| Civil Service & Independent Professionals | 6.4 | 7.1 | 40.1 |
| Domestic Service | 8.0 | 3.6 | |
| Industrial Labor & Building Trades | 37.5 | 22.5 | |
| | 100 | 100 | 100 |

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failed to mention the mother's occupation or did not even say who the mother was.

Of the 224 mothers whom we can identify with any detail we found that 211, or 94.2% were housewives. Of the 13 mothers who were employed, only one was a physician, three were teachers and three were merchants.

We now turn to the occupations of achievers themselves. This is an area of considerable importance to this inquiry, not only because occupational success is identical with occupation in most instances, but also because occupation is the most important measure or criterion of socio-economic status.

Over 16% of the 375 subjects studied here were physicians. This does not mean that all of these 62 achievers became famous in that field because one physician achieved fame as a writer and another as an artist. It is however, very significant that the field of medicine was so popular with German Jewish achievers and was so often an area of Jewish occupational choice as it still is.

Several reasons for this Jewish proclivity towards medicine can be advanced. First, medicine has historically served the Jewish population well because it could be practiced anywhere. Since Jewish history is the history of exile and wanderings from country to country it became evidently necessary for Jewish breadwinners to invest in occupations that could be practiced in all places and at all times. Illness is everywhere and therefore medicine could be used by its practitioners after every expulsion. The same holds true for violin playing, another Jewish interest. Like medicine, violin playing took very little portable equipment and could be used regardless of language in any place to which the Jew was obliged to go.

A second reason for the unusual interest in medicine by the German-Jewish achievers with whom we are here concerned was that it was deemed to be of low political significance and consequently invited less state regulation based on ethnic or religious discrimination. At this time, the medical profession was expanding rapidly and Jews were able to enter the profession without the need for a university oppointment. In Nineteenth Century Germany, as we have seen, university appointments were all state controlled and normally not available to Jews. Only those who converted (at least nominally) were given such appointments. The same held for the civil service and for participation in most trades. Thus, medicine and a few other

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independent professions permitted Jews to earn a living as Jews and not as pseudo-converts.

A third reason for the considerable interest of German Jews in the medical field was the great growth of that field in the Nineteenth Century. This growth permitted the entry of new personnel without restrictive opposition from established practitioners. Thus, Jewish talent could find expression in this field and therefore gave rise to achievements in this area because the opportunity existed.

The second most frequent occupation in which our achievers engaged was rabbi. This interest in a theological career is visible in other minority achiever groups as well. Often the goals of scholarship, learning and advancement can be achieved in the face of selective discrimination by using the in-group clergy as an alternative status system. This was as true of the German-Jewish rabbinate as of the rabbinate in all other European countries wherein discrimination against the Jewish population was a matter of course in the Nineteenth and the Twentieth Centuries. Thus, nearly seven percent of our 375 achievers were rabbis. This is by no means a high number, considering that achievers in diverse cultures here tended to use the clergy as a means of improving their social standing.(1) Thus, almost all the leadership of the black civil rights movement in America achieved advancement through the ranks of the clergy.

Lawyers constituted 4.8% of our achievers. This occupation also lends itself to private practice, but was by no means as attractive to the achievers here studied as was medicine. The same held true for the German-Jewish population in general. Many appointments in the German bureaucracy were and still are given to lawyers. However, Jews are normally not appointed to government positions unless they at least nominally converted to Christianity. A good number did so, but this barrier held back many who might have otherwise entered the profession. As in the case of other graduate or professional schools. German law schools exhibited considerable prejudice against Jewish students and made the entry of Jews into that profession very difficult.

Lawyers traditionally entered into politics, another area in which Jews faced restrictions or at least difficulties, against them. Jews who practiced law on a private basis might prejudice the courts against their clients, and this made it difficult

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for Jewish lawyers to attract enough clients to enable them to earn a livelihood. The combination of those factors militated to reduce the number of Jewish lawyers who practiced in Germany between 1839-1939.

Some 70 (18.9%) achievers are cited for contributions to the natural sciences. Many of these were trained in medicine since the Ph.D. and the D.Sc. was either uncommon or did not then exist. Thus, a total of 108 members of our achieving group had M.D. degrees or degrees related to the natural sciences, constituting 28% of all of our achievers.

### Socio-Economic Status

We classified our subjects as to socio-economic class, using occupation as the basis of determination. Similarly we assessed the socio-economic status of their parents and their in-laws wherever this was possible. It is striking that 67.7% of our subjects were members of what we determined to be an upper middle class occupational status and that over 5% were members of the uppermost level. Thus, over 72% achieved not only fame but also fortune. When compared to their parents, we see that only slightly more than 35% of the prior generation belonged to the upper or upper middle level. However, fully 56.3% of parents belonged to the middle class, meaning that they had the income necessary to provide their children with a higher education.

Over 56% of wives of achievers came from homes who belonged to the upper middle or upper socio-economic levels. Thus, most of our achievers either married within their own class or married up, since only 35% of their own parents belonged to those classes. It should be noted however, that we were able to obtain the social class of in-laws in only 25% of our biographies (N 96).

### Country of Success

Ninety-three percent of the achievers here reviewed succeeded in the confines of Germany as understood at the founding of the German Empire in 1870.

Five of the total originally achieved distinction in Europe outside of Germany, while 19 or 5.1% gained fame after emigration to the United States, and another 0.5%, i.e., 2 became achievers elsewhere in the world.

The fact that these achievers were able to attain distinction

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in Germany where anti-Jewish conduct was widespread does not mean that there is any evidence that such discrimination actually promotes achievement. This "challenge and response" theory is negated by the fact that achievers mostly came from an upper middle socio-economic background and rarely belonged either to a lower class or were female. If disadvantage were really a reason for attainment in a "challenge and response" fashion, male Jews from poor backgrounds or female Jews should be the largest component in the achiever group. Clearly, that is not the case.

### Trouble with the Law

Twenty-three percent, i.e. 87 (23.2%) of our achievers had trouble with the law, prior to 1933 (ie. this figure does not include those who experienced trouble under the Nazi regime). Of those who were charged prior to 1933, more than a third i.e. 31 were exiled from Germany for political activities, while nearly 13% (12.6%) i.e. 11 were charged with political crimes. A political crime in Nineteenth Century Germany and elsewhere was usually a verbal or written attack upon establishment authority, participation in socialist activities or publication of prohibited books and newspapers. In addition to these "political" crimes, three of our achievers were convicted of religious "heresy," (undefined) five jailed for debt, one committed a felony, and thirty-six others were convicted of a variety of other offenses (undefined).

The persecution of minorities, including intellectual and artistic achievers, is an old established practice found in almost all parts of the world at different times. Earlier examples are the expulsion of the Christian scholars from the Byzantine Empire (Constantinople) after the Moslem (Turkish) conquest of 1453 and the massacre of the Armenians in that same country in 1915, as well as the mass migration of Russian artists and intellectuals to Western Europe and the USA after the revolution of 1917.

However, one major characteristic of the Nazi policy was its emphasis upon questions of a racial or ethnic category, rather than religious affiliation, so that those Jews who had accepted conversion to Christianity, or even declared themselves to be atheists were not exempted. The category, "non-Aryan" or "Jewish" was one from which there was no escape, no matter what the individual did or did not do. Thus, any person who

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had one or more Jewish grandparent was subject to dismissal from an academic appointment. Since no one can alter the identity of his grandparents, except through forgery, there was no escape from Nazi accusations concerning such origins. Therefore all those of our achievers who lived long enough to be present in Germany during the Nazi rise to power were affected by these policies. Of the 62 achievers thus affected, over half, i.e., 60% emigrated from Germany, while 14, somewhat more than 20%, died, 5 committed suicide and 6 were imprisoned. The books and art of seven of these achievers were banned by the Nazi regime. It is of course likely that many more works which might have been published were not published because their authors were "non-Aryan".

### Blood Relatives and Students of Others in this Study

Only 12 of our subjects were related to another subject in this study. Six were children of one of our subjects and six were otherwise related.

Thirty-four persons in this study were the students of someone else who was also included in this study. This is a high number and clearly shows that achievement or social recognition of achievement is distinctly related to studying with someone who is also a great achiever. This once more reinforces our contention that achievement is group-related and is not usually possible alone. Just as we found a connection between achievement and attainment in two previous generations, so we see that study under competent and prestigious teachers and professors is important. This is true not only because very competent people can help others to achieve, but also because eminent scholars can recognize and develop talents in their students. Furthermore, exceptional students are likely to seek out prominent scholars and leaders in their field in order to gain the advancement promised by such an association.

### Children of Achievers

We were able to establish that 136 of our achievers had children. This was possible only because we went to exceptional lengths to find this information. Thus, we used obtituaries in addition to the methods already outlined. This does not mean that the other achievers had no children. It only means that the biographies often only mentioned children when they were

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remarkable in some manner. Twenty-two of the 136 had one son who was himself an achiever in the sense of having reached some degree of distinction in an academic or artistic enterprise. Twenty-one had one daughter listed as an achiever. This constitutes 31.6% of our sample and once more underscores the relation between parental achievement and achievement of children. Almost 23% of our achievers had four children or more. Six of the children of subjects in this study were themselves achievers.

## Summary and Conclusions

This study is based on the collection of 375 biographies of achieving German Jews of the Nineteenth Century. Methodologically, numerous difficulties presented themselves as we progressed. Principal among these was the great difficulty encountered in collecting information of a sociologically significant kind from the biographies available. Apparently, many biographers, and often the achievers themselves, did not detail their origins, notably omitting information about their mothers or even their brothers and sisters or their children. Much material found by us dealt only with the professional attainments of the subject.

Therefore it became necessary for us to rely on data which were less than 100%, and in some categories were quite small. Nevertheless, we presented them here since this constitutes all the information we could find.

### FOOTNOTES

(1) See Bonnie Bullough and Vern Bullough, "Historical Sociology: Intellectual Achievement in Eighteenth Century Scotland," *The British Journal of Sociology*, vol. 24, no. 4, December 1973, pp. 418-430; Vern Bullough, "Intellectual Achievement in Eighteenth Century Scotland," *The Comparative Education Review*, vol. 14, no. 1, February 1970, pp. 90-102; Vern Bullough, "Achievement, Professionalization, and the University," in J. Paquet and J. Ljosjin, eds., *Los Universites a la Fin de Moyen Age*, Louvain, 1978; Vern Bullough, "Dissenting Thoughts on Intellectual and Creative Achievement," *The Humanist*, vol. 40, no. 1, January/February 1980, pp. 43-53; Vern and Bonnie Bullough and Maddalena Mauro, "Age and Achievement: A Dissenting View," *The Gerontologist*, vol. 18, no. 6, December 1978, pp. 584-587; Vern Bullough, Bonnie Bullough, Martha Voght, and Lucy Klockhohn, "Longevity and Achievement," *Omega*, vol. 1, no. 2, May 1970, pp. 115-119; Vern Bullough and Bonnie Bullough, "The Computer, the Historian and Some Variables of Achievement," *Computer Studies*, vol. 4, no. 3-4, 1973, pp. 117-123. Vern Bullough and Bonnie Bullough, "The Causes of the Scottish Medical

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Renaissance in the Eighteenth Century," *Bulletin of the History of Medicine,* vol. 45, no. 1, January/February 1971, pp. 13-28.

(2) Francis Galton, *Hereditary Genuis,* New York, 1870.

(3) See Frank Barren, "Originality in Relation to Personality and Intellect," *The Journal of Personality*, vol. 25, no. 6, December 1957, pp. 730-742; John E. Drevdahl, "Factors of Importance for Creativity," *The Journal of Clinical Psychology,* vol. 12, no. 1, January 1956, pp. 21-26; Russell Eisenman and Nancy Robinson, "Complexity, Simplicity, Creativity, and Other Correlates," *The Journal of Psychology,* vol. 67, no. 3, November 1967, pp. 331-334; Joy P. Guilford, *The Nature of Human Intelligence,* New York, 1967; Llam Hudson, *Contrary Imagination,* Baltimore, 1966; Quinn McNemar, "Lost Our Intelligence? Why?", *American Psychologist,* vol. 19, no. 12, December 1964, pp. 871-882; Anne Reem *The Making of a Scientist,* New York, 1952; Michael A. Wallach and Nathan Kogan, *Modes of Thinking in Young Children*, New York, 1965, Michael A. Wallach and Cliff W. Wing, *The Talented Student,* New York, 1969; Kaotu Yamamoto, *The Role of Creative Thinking and Intelligence in High School Achievement,* New York, 1965. For other views see: Benjamin Bloom, *Stability and Social Change in Human Characteristic,* New York, 1964; Rose L. Coser, *Life Cycle and Achievement in America,* New York, 1969, and Jerome Kagan, *Creativity and Learning,* Boston 1967.

(4) Catherine M. Cox, *The Early Mental Traits of Three Hundred Geniuses,* Palo Alto, 1926.

(5) Alfred L. Kroeber, *Configuration of Cultural Growth*, Berekeley, 1944.

(6) Charles E. Gray, "A Measurement of Creativity in Western Civilization," *The American Anthropologist,* vol. 68, no. 6, December 1966, pp. 1384-1416.

(7) Pitirim Sorokin, *Social and Cultural Dynamics,* New York, 1937-1941.

(8) Charles E. Gray, "An Analysis of Greco-Roman Development," *The American Anthropologist*, vol. 60, no. 1, February 1958; Silvano Arieti, *Creativity: The Magic Synthesis,* New York, 1976; Raoul Naroll, E.C. Benjamin, F.K. Fohl, M.J. Fried, R.E. Hildreth, and J.M. Schaefer, "Creativity: A Cross Historical Pilot Survey," *The Journal of Cross Cultural Psychology,* vol. 2, no. 2, June 1971; Dean K. Simonton, "Age and Literary Creativity: A Crosscultural and Transhistorical Survey," *The Journal of Cross Cultural Psychology,* vol. 6, no. 3, September 1975. Dean K. Simonton, *Genius and Leadership,* Cambridge, 1984.

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(11) Max Weber, *The Protestant Ethic and the Spirit of Capitalism,* New York, 1930.

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(13) See no. 1.

(14) *Brockhaus Konversationskexikon,* Leipzig, 1906.

(15) *Die Neue Deutsche Biographie*, Berlin, 1950.

(16) *The Jewish Encyclopedia,* New York, no date.

(17) *The Universal Jewish Encyclopedia,* New York, 1948.

(18) *The Encyclopedia Judaica,* New York, 1971-1972.

(19) *The Dictionary of Scientific Biography,* New York, 1970.

(20) See Gy. Asceadi and J. Nemerski, *History of Human Life Span and Mortality,* Budapest, 1970, p. 258.

(21) Arthur Prinz, *Juden im Deutschen Wirtschaftsleben,* Tübingen, 1984.

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**THE HUMAN SKELETON IN FORENSIC MEDICINE**
*Wilton Marion Krogman and Mehmet Yasar Iscan*
Charles C Thomas, Publisher, Springfield, Illinois

The second edition of this classic text is based upon 65 years of combined author experience. Doctor Wilton Marion Krogman began his word-renowned career while working on his first skeletal case in 1927. Since then he has completed literally hundreds of cases with a 95 percent rate of successful identification. Dr. Krogman's expertise, combined with that of Dr. Iscan, enables them to present this highly specialized evaluation of our current state of knowledge in forensic anthropology.

They emphasize the theme of intrinsic variability throughout the text and its range, whether in age-time or measurement, is a major concern. As a result, there is constant emphasis on the reliability of the many different determinations to be made when literally searching for "x, the unknown."

New to this edition are detailed discussions of crime scene investigation, including excavation techniques, time interval since death, physical and chemical methods, human or animal remains, burned bones, and preparation of the remains. Also new is a section on dental analysis examining such topics as dental anatomy, nomenclature, estimation of age in subadults and adults, the dental genetics and congenital conditions. Existing chapters, all updated, bring readers in line with the current concepts of: skeletal age; early years, cranium, postcranium; determination of sex and parturition; assessment of racial affinity; calculation of stature; factors of individualization; restoration of physiognomy; and radiographic analysis.

**HOW WE LEARN TO READ**
*Seymour W. Itzkoff*
Paideia Publishers, Ashfield, Massachusetts

The education reform movement in the United States, dramatically launched with the publication of the critical report on American educational performance *A Nation at Risk*, has

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brought reexaminations of current practices of teaching subject matter. Smith College Professor of Education and Child Study Seymour W. Itzkoff examines the context of how one learns to read in the broader concept of the discovery of writing, the advance toward literacy, and the differing means used to teach reading.

Professor Itzkoff brings an impressive array of sciences including psycholinguistics, neurobiology, human development, and the reading process to his study. He moves beyond long ranging debate over the phonics versus look-say (whole-word) approach and engages another model: the reading/integrational system. He notes that the phonics method should be treated not as an end in itself (since it is too slow and befuddling ever to learn to enjoying reading for understanding and appreciation) but only as a stage on the way toward "rapid featural encoding of the visual word patterns directly to meaning and comprehension". The look-say method has its deficiencies in not teaching students to appreciate various sounds and impedes the learning of new words.

The key to reading, Itzkoff urges, is not just sounding out syllables or recognizing words as a whole but "those shorthand visual features that the neurological matured youngsters can distill from their rapidly moving visual reading gulps into meaningful units, whether words, sentences, or paragraphs" (p. 19)". The integrational system is a crucial element in attaining reading competency because it makes the best use of the diverse biopsychological structures in the human nervous system which lead to the process of reading.

The author covers what exactly is the reading process, a discussion of the debate over various methods of teaching reading in public education, a focus on how a child actually learns to read, and explains why the reading/integrational system is a better method to teach reading. During an age where nations of the world are concerned about improving literacy, the research and arguments of Professor Itzkoff deserve the the careful attention of scholars who want to improve both reading and literacy.

*Dr. Donald J. Senese*

(Dr. Senese served as the Assistant Secretary for Educational Research and Improvement, U.S. Department of Education, 1981-1985, and is currently a writer on educational and public policy issues.)

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